National Aeronautics and Space Administration

Fiscal Year 2011

Summary of Performance and Financial Information

www.nasa.gov

Cover photo: *Atlantis*' chute slows the Space Shuttle on the runway at Kennedy Space Center, bringing the last Shuttle mission—STS-135—to a successful close. Onboard are STS-135 Commander Chris Ferguson, Pilot Doug Hurley, and Mission Specialists Sandra Magnus and Rex Walheim. (Credit: NASA/K. Allen)

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Message from the Administrator

February 15, 2012

I am pleased to present NASA's fiscal year (FY) 2011 Summary of Performance and Financial Information. This report allows us to share our FY 2011 successes and setbacks with the American people as we strive to achieve our Mission. This performance and financial information also provides valuable insight into our stewardship of taxpayer dollars and the resources entrusted to NASA.

FY 2011 was a year of remarkable change for NASA. As we closed the door on 30 years of Space Shuttle flights, we opened the door to a new era of exploration and took our critical first steps on that path. We unveiled a new Strategic Plan with NASA's new Vision and long-term goals to guide our activities and priorities over the next decade while continuing our commitment to NASA's core values of Safety, Integrity, Teamwork, and Excellence.

This year, we turned a page in space exploration history as we said a heartfelt farewell to the Space Shuttle. Between the first launch on April 12, 1981, and the final landing on July 21, 2011, NASA's Space Shuttle fleet—*Columbia*, *Challenger*, *Discovery*, *Atlantis*, and *Endeavour*—flew 135 missions, helped construct the International Space Station (ISS), and inspired generations. The orbiters *Discovery*, *Atlantis*, and *Endeavour* are undergoing preparations to be delivered to museums across the country, where they will continue to inspire the next generation of explorers and remind us of what the vision and dedication of a Nation can accomplish.

Retiring the most recognizable icon of U.S. space exploration was not an easy decision, but it was the right one. The time has come for us to set our sights on a new era of exploration. We are stimulating efforts within the private sector and paving the way for a robust U.S. commercial capability to take both crew and cargo safely to the ISS and low Earth orbit. Our commercial partners are making substantial progress as evidenced by the successful orbital test of the Dragon capsule on the Falcon 9 rocket in December 2010, which is a key milestone toward the spacecraft rendezvousing with the ISS in the next year.

While the commercial sector is focused on low Earth orbit access, we have set our sights on a new space exploration system that will take humans far beyond Earth. In September 2011, we selected the design for this new space exploration system—a heavy-lift rocket that will be America's most powerful since the Saturn V rocket that carried Apollo astronauts to the Moon. The Space Launch System (SLS) will be able to launch humans to asteroids, Mars, and other deep space destinations. This critical design decision will create jobs here at home and provide the cornerstone for America's future human space exploration efforts.

Space exploration is not just about innovation and discovery, it is a story of perseverance. Often, it takes years to watch a project come to fruition—but the rewards are well worth the wait. NASA's scientific discoveries just keep coming and coming, based on that perseverance. In September 2007, we launched the Dawn spacecraft to the asteroid belt between Mars and Jupiter to learn more about the two largest asteroids, Vesta and Ceres, after more than five years since Dawn was selected as a mission. In July 2011, after a journey of more than a billion miles, and more than three and a half years, Dawn achieved orbit around Vesta. With a diameter of 330 miles (530 kilometers), Vesta is the second most massive object in the asteroid belt, second only to Ceres. Dawn will orbit Vesta for a year before moving on to Ceres. Dawn's science instruments will measure surface composition, topography, and texture. Dawn will also measure the tug of gravity from Vesta and Ceres to learn more about their internal structures. Studying these two giant asteroids will not only help scientists unlock the secrets of our solar system's early history, but it will also provide us with valuable information for the future exploration of these bodies and greater insight into how we might address any asteroids that pose a threat to Earth.

We are proud of the progress we made this year. You will find highlights of our programmatic and fiscal activities in the Management's Discussion and Analysis section of the Performance and Accountability Report (PAR). However, I encourage you to read the Detailed Performance section of the PAR to learn more about our successes and setbacks. For the setbacks, you will find detailed information on the causes and what we plan to do to get back on track. I also encourage you to peruse the Financials section of the PAR, to get a better understanding of how we are managing our resources—your tax dollars. Included in the Financials section are letters and reports from our external auditors and our Inspector General that speak to our progress.

NASA makes every effort to ensure that performance data are subject to the same attention to detail as is devoted to our scientific and technical research. With this in mind, I can provide reasonable assurance that the performance data in this report are reliable and complete. Any data limitations are documented explicitly in the report.

In addition, NASA accepts the responsibility of accounting for and reporting on its financial activities. During FY 2011, NASA received an unqualified "clean" opinion on its financial statements. This significant achievement resulted from the efforts of dedicated personnel across the Agency, a sound system of financial controls, and adherence to our Comprehensive Compliance Strategy and Continuous Monitoring Program. In addition, we continue to be in substantial compliance with the Federal Financial Management Improvement Act. Based on the results of this year's efforts, I am able to provide reasonable assurance that this report's financial data are reliable and complete.

To meet national needs, President Barack Obama has given NASA and our partners a grand challenge to out-innovate, out-educate, and out-build our competitors, and to create new capabilities that will take us farther into the solar system while learning about our place in it. Our accomplishments this year herald our progress toward meeting this grand challenge. The hard work, expertise, and dedication of NASA's employees and partners have enabled us to come this far, and will be critical as we continue to do the big things only NASA can do and challenge ourselves as a people to reach our highest potential. As we close this fiscal year and begin another, we will continue our commitment to being an exceptional resource for exploration, innovation, discovery, and education for this Nation, and we look forward to the challenges and opportunities that the next year will bring us.

Charles F. Bolden, Jr.
Administrator

Fiscal Year 2011

Welcome to NASA

NASA was created by the National Aeronautics and Space Act of 1958 to provide for research into problems of flight within and outside the Earth's atmosphere and to ensure that the United States conducts activities in space devoted to peaceful purposes for the benefit of mankind. In 2010, the President unveiled an ambitious new direction for NASA, laying the groundwork for a sustainable program of exploration and innovation. Called the National Space Policy, this direction extends the life of the International Space Station (ISS), supports the growing commercial space industry, and addresses important scientific challenges. It also continues NASA's commitment to robust human space exploration, science, and aeronautics programs. Later in 2010, Congress passed the NASA Authorization Act of 2010, which provided the Agency important guidance on program content and conduct.

On February 14, 2011, NASA released a new Strategic Plan that embraces the spirit, principles, and objectives of this and other recent policies and legislation.[1] The plan introduced a new framework for outlining NASA's strategic direction.

The NASA Vision

To reach for new heights and reveal the unknown, so that what we do and learn will benefit all humankind.

The NASA Mission

Drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.

The plan included a Vision statement[2] and a new Mission statement.

The following overarching strategies, as defined in the 2011 Strategic Plan, govern the management and conduct of NASA's aeronautics and space programs. These are standard practices that each organization employs in developing and executing their plans to achieve the Agency's strategic goals and annual performance plan. They also provide a framework that guides the way NASA supports other areas of national and Administration policy: government transparency; science, technology, engineering, and mathematics (STEM) education; energy and climate change; innovation; and increased citizen and partnership participation to help address challenges faced by the Nation.

- **Investing in next-generation technologies** and approaches to spur innovation;
- **Inspiring students** to be the future scientists, engineers, explorers, and educators through interactions with NASA's people, missions, research, and facilities;
- **Expanding partnerships** with international, intergovernmental, academic, industrial, and entrepreneurial communities and recognizing their role as important contributors of skill and creativity to NASA's missions and for the propagation of NASA's results;

1. In 2006, the Administration published the National Aeronautics Research and Development Policy, guiding the Nation's goals in aeronautics technology research and development.
2. Although NASA has had Vision statements in the past, for the 2006 Strategic Plan NASA senior management chose to not include a Vision statement.

- **Committing to environmental stewardship** through Earth observation and science, and the development and use of green technologies and capabilities in NASA missions and facilities; and
- **Securing the public trust** through transparency and accountability in NASA's programmatic and financial management, procurement, and reporting practices.

NASA's Organization

NASA's science, research, and technology development work is focused and implemented through three mission directorates and assisted by the mission support directorate. Additionally, NASA has three offices that directly support NASA's Mission and Vision.

The **Aeronautics Research Mission Directorate (ARMD)** explores early-stage concepts and ideas, develops new technologies and operational procedures through foundational research, and demonstrates the potential of promising new vehicles, operations, and safety technology in relevant environments. ARMD is focused on cutting-edge research and technologies to overcome a wide range of aeronautics challenges for the Nation's current and future air transportation system.

The **Human Exploration and Operations (HEO) Mission Directorate** was newly formed in August 2011. It merged the Exploration Systems and Space Operations Mission Directorates, creating an organization dedicated to enabling human and robotic space exploration. HEO operates the International Space Station and is developing technologies and capabilities for human exploration beyond low Earth orbit. It manages the commercial crew and cargo developmental programs, construction of the Orion Multi-Purpose Crew Vehicle, development of a new heavy lift rocket known as the Space Launch System, launch operations, space communications, rocket propulsion testing, human health and safety, and exploration technology development, the latter to enable human exploration of deep space.

The **Science Mission Directorate (SMD)** conducts the scientific exploration of Earth, the Sun, the solar system, and the universe. SMD's missions include ground-, air-, and space-based observatories, deep-space automated spacecraft, planetary orbiters, landers, and surface rovers. SMD also develops innovative science instruments and techniques in pursuit of NASA's science goals.

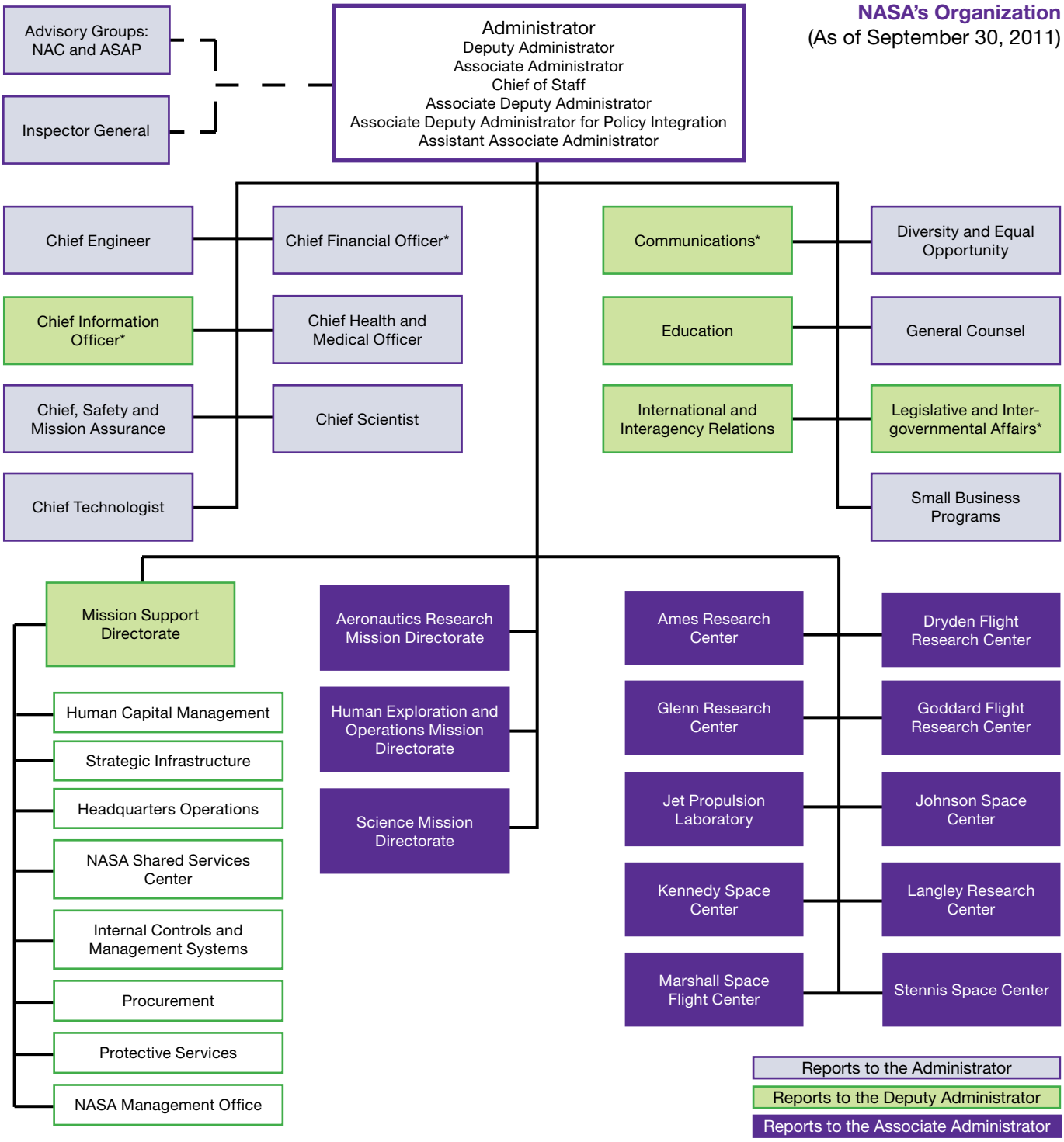
The **Mission Support Directorate (MSD)** strengthens the efficiency and management of Agency-level operations under a single associate administrator. MSD includes Agency and Center management and operations, facility construction, budget and finance, information technology, human capital management, and infrastructure. Organizing NASA's mission support services into a mission directorate ensures that management practices are uniform across the Agency and that these support services maintain maximum visibility inside and outside the Agency.

The **Office of Education (Education)** is responsible for developing and managing a portfolio of programs that translate NASA's mission focus and achievements into educational activities, tools, and opportunities for students and teachers at all levels. Education's goals are to strengthen the future workforce for the benefit of NASA and the Nation, attract and retain students in STEM disciplines, and engage the public in NASA's missions. To achieve these goals, Education partners with other government agencies, non-profit organizations, museums and education centers, and the education community at large.

The **Office of the Chief Technologist (OCT)** is the principal advisor and advocate on matters concerning Agency-wide technology policy and programs. OCT directly manages NASA's Space Technology programs and coordinates and tracks all technology investments across the Agency.

The **Office of the Chief Scientist** is the principal advisor and advocate on Agency science programs, strategic planning, and the evaluation of related investments. The Office of the Chief Scientist represents the scientific endeavors in the Agency, ensuring they are aligned with and fulfill the Administration's science objectives.

NASA's Organization
(As of September 30, 2011)

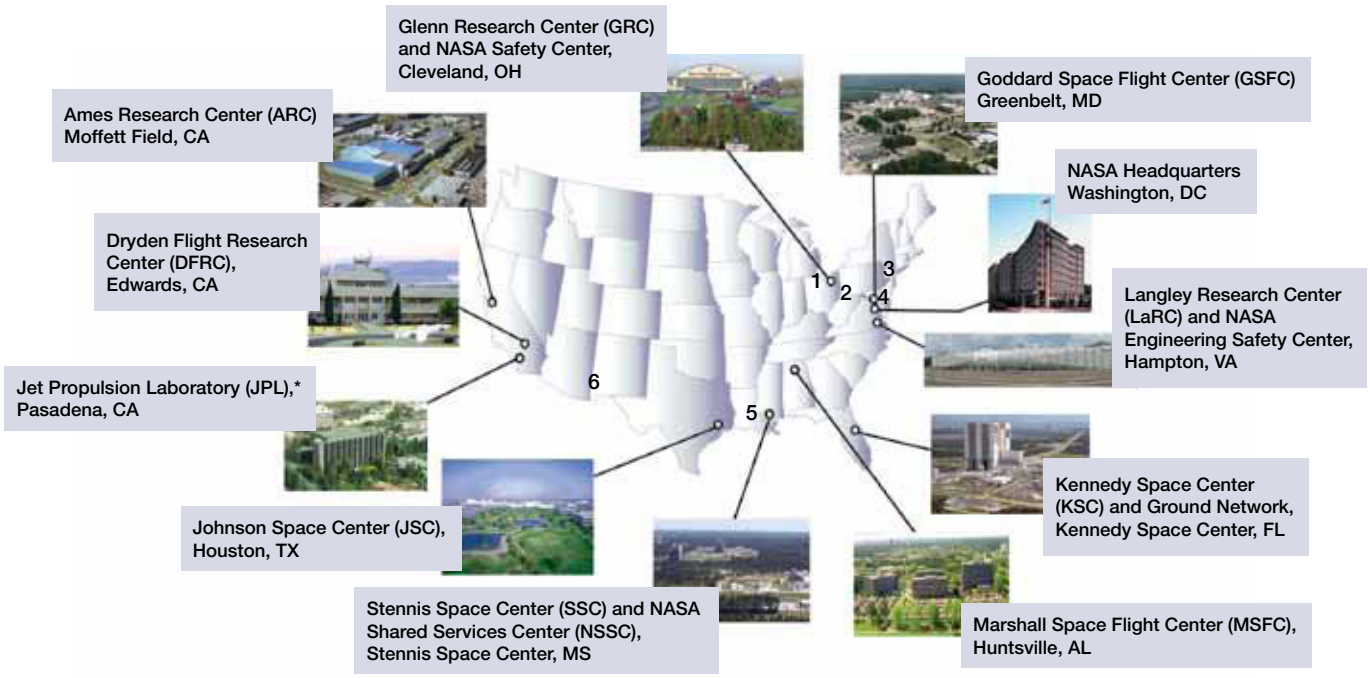


*Center functional office directors report to Agency functional Associate Administrators. Deputy and below report to Center leadership. Dashed lines indicate independent organizations that report to the Administrator.

The Administrator's Staff Offices provide a range of high-level guidance and support in critical areas like safety and mission assurance, technology planning, education, equal opportunity, information technology, financial administration, small business administration, international relations, and legislative and intergovernmental affairs.

NASA is comprised of Headquarters in Washington, DC, nine Centers located around the country, and the Jet Propulsion Laboratory, a federally funded research and development center (FFRDC) operated under a contract with the California Institute of Technology. In addition, NASA partners with academia, the private sector, state and local governments, other Federal agencies, and a number of international organizations to create an extended NASA family.

NASA Centers and Facilities Nationwide



*The Jet Propulsion Laboratory is an FFRDC. The workforce are employees of the California Institute of Technology.

Other NASA facilities noted on the map by number include: 1) Plum Brook Station, Sandusky, OH, managed by GRC; 2) Software Independent Verification and Validation Facility, Fairmont, WV, managed by GSFC; 3) Goddard Institute for Space Studies, New York, NY, managed by GSFC; 4) Wallops Flight Facility, Wallops, VA, managed by GSFC; 5) Michoud Assembly Facility, New Orleans, LA, managed by MSFC; and 6) White Sands Test Facility and Space Network, White Sands, NM, managed by JSC.

For more information about NASA's organization go to http://www.nasa.gov/about/org_index.html.

NASA's Workforce

As of August 18, 2011, NASA employed more than 18,500 on-duty civil servants (full-time, part-time, term appointment, student and other non-permanent) at nine Centers, Headquarters, and the NASA Shared Services Center, with approximately 5,000 people at the Jet Propulsion Laboratory. To see more information about workforce profile and distribution, visit the Workforce Information Cubes for NASA at http://wicn.nssc.nasa.gov/.

This year, the Office of Human Capital Management (OHCM) released a Workforce Plan that outlines the policies, processes, and structures needed to ensure that critical workforce skills and capabilities are available and effectively used in the timeframe needed to enact the major activities of the Agency's Mission. The 2011 Workforce Plan has an overarching strategic workforce goal—identify, acquire, and sustain the workforce needed to successfully conduct NASA's current and future missions—supported by five workforce goals:

- **Workforce Goal 1:** Plan strategic human capital and position for mission success—Analyze, develop policy, conduct organizational design and resource alignment to guide NASA's multi-sector workforce.
- **Workforce Goal 2:** Recruit and employ a highly qualified, diverse workforce—Identify, attract, and employ a diverse workforce with the right skills, at the right time, at the right place.
- **Workforce Goal 3:** Train and develop talent—Create and conduct training and development initiatives that address today's and tomorrow's needs and enable mission success.
- **Workforce Goal 4:** Sustain a high-performing workforce—Enable managers to sustain an environment conducive to workforce productivity, innovation and effectiveness.
- **Workforce Goal 5:** Enable efficient human capital services—Develop effective human resources programs supported by comprehensive, timely, and validated information.

OHCM will revise the Workforce Plan to support NASA's evolving strategic direction and priorities and changing workforce needs.

Shared Values, Shared Results

NASA believes that mission success is the natural outcome of an uncompromising commitment to the Agency's four shared core values: safety, integrity, teamwork, and excellence.

Safety: Constant attention to safety is the cornerstone of mission success. NASA is committed, individually and as a team, to protecting the safety and health of the public, NASA team members, and the assets that the Nation entrusts to the Agency.

Integrity: NASA is committed to maintaining an environment of trust, built on honesty, ethical behavior, respect, and candor. Agency leaders enable this environment by encouraging and rewarding a vigorous, open flow of communication on all issues, in all directions, and among all employees without fear of reprisal. Building trust through ethical conduct as individuals and as an organization is a necessary component of mission success.

Teamwork: NASA's most powerful tool for achieving mission success is a multi-disciplinary team of diverse, competent people across all NASA Centers. NASA's approach to teamwork is based on a philosophy that each team member brings unique experience and important expertise to project issues. Recognition of, and openness to, that insight of individual team members improves the likelihood of identifying and resolving challenges to safety and mission success. NASA is committed to creating an environment that fosters teamwork and processes that support equal opportunity, collaboration, continuous learning, and openness to innovation and new ideas.

Excellence: To achieve the highest standards in engineering, research, operations, and management in support of mission success, NASA is committed to nurturing an organizational culture in which individuals make full use of their time, talent, and opportunities to pursue excellence in both the ordinary and the extraordinary.

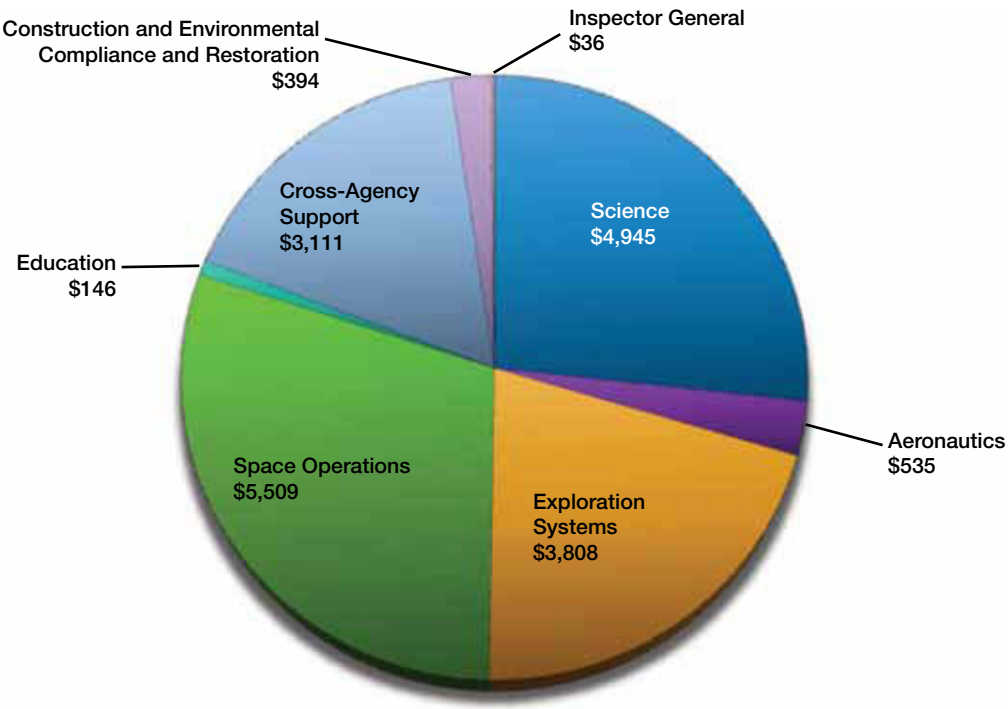
An engineer from Ball Aerospace guides the NPOESS Preparatory Project (NPP) satellite into a thermal vacuum chamber for environmental testing. Once the satellite is inside, the air is pumped out of the chamber and temperature extremes are applied to replicate orbit conditions. Completing a project like NPP requires dedication, teamwork, and attention to detail from all participants—NASA, contractors, and partners. (Credit: Ball Aerospace)

Budget for Performance: NASA's FY 2011 Budget

On April 15, 2011, President Barack Obama signed into law a full-year continuing resolution (CR) for fiscal year 2011.[1] Congress uses CRs to continue funding government functions if an appropriations bill has not been signed into law by the end of the fiscal year. This authorizes agencies to fund their programs at the existing or a reduced level, until either the resolution expires, or an appropriations bill is passed.

The 2011 CR, which gave NASA $18,485 million for the fiscal year, directed NASA to pursue the human exploration goals set in the NASA Authorization Act of 2010 and called for the development of the Space Launch System and a Multi-Purpose Crew Vehicle. The chart below shows the details of the CR by each of NASA's appropriation accounts.[2]

Full-Year Continuing Appropriations Act of 2011, Total $18,485
(Dollars in Millions)



Note: NASA merged Exploration Systems and Space Operations into a new, single organization, Human Exploration and Operations, later in the fiscal year.

NASA's budget requests are available online at http://www.nasa.gov/news/budget/index.html.

1. Department of Defense and Full-Year Continuing Appropriations Act of 2011 (P.L. 112-10).
2. In the FY 2011 Budget Request, NASA requested that an appropriation account be created for Aeronautics and Space Technology, which would fund both aeronautics and space research and technology activities. Under the year-long CR, the activities associated with space research and technology remained in existing accounts, and NASA began new Space Technology initiatives in the Space Operations account. These initiatives are guided by the Office of the Chief Technologist.

Continuing Performance on the Implementation of the American Recovery and Reinvestment Act

The American Recovery and Reinvestment Act of 2009 (Recovery Act) was signed into law by President Obama, on February 17, 2009. It was an unprecedented effort to jump-start the Nation's economy by creating and saving jobs and investing in long-term growth, while holding the Federal government to levels of accountability and transparency in spending,

NASA received $1,050 million of Recovery Act funding in FY 2009 ($1,002 million Direct Appropriation and $48 million Reimbursable Authority), all of which was obligated to projects to support the Nation's economic recovery and advance NASA's research mission. The Agency received an additional $4 million in Recovery Act Reimbursable Authority in FY 2010. NASA provides an overview of the Recovery Act and NASA's implementation efforts at http://www.nasa.gov/recovery/index.html.

Since the Recovery Act was signed into law, NASA leveraged its funding to achieve the purposes set forth by this important law. NASA's Recovery Act funds augmented research and development activities in the key program areas of Aeronautics Research, Science (with an emphasis on Earth Science and Astrophysics), and Exploration and were used to restore critical NASA-owned facilities damaged from hurricanes during 2008.

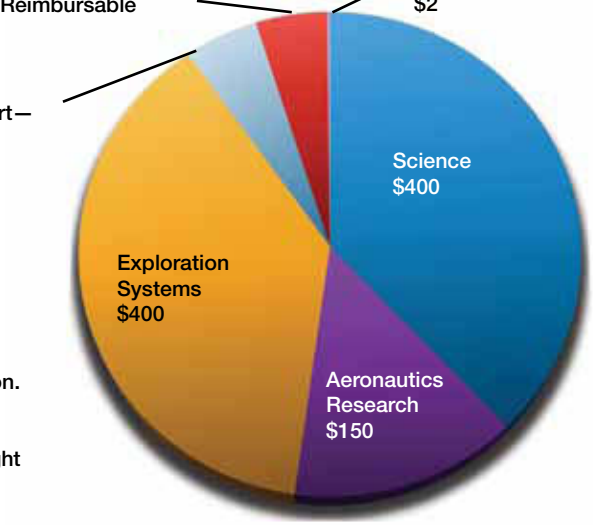
NASA Recovery Act Funding Total: $1,054
(Dollars in Millions)

- **Restore NASA-owned facilities damaged by hurricanes and other natural disasters that occurred in 2008.**

Cross-Agency Support—Non-Reimbursable $50

Inspector General $2

Cross-Agency Support—Reimbursable* $52



- **Accelerate the development of Earth science climate research missions recommended by the National Academies' decadal survey.**
- **Increase NASA's supercomputing capabilities.**

- **Fund planned mission development activities that could contribute to future exploration.**
- **Stimulate efforts within the private sector to develop and demonstrate human spaceflight capability.**

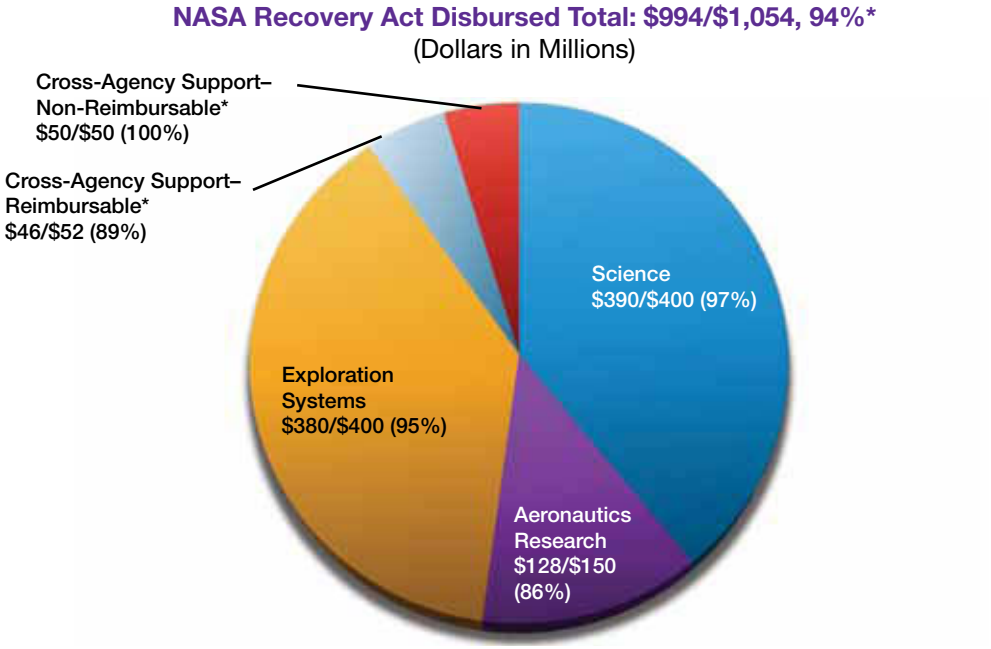
- **Undertake systems-level research, development, and demonstration activities related to aviation safety, environmental impact mitigation, and development of the Next Generation Air Transportation System (NextGen).**

*Reimbursable activities for other Federal agencies' Recovery Act programs.

Highlights of NASA's investments included:

- Undertaking systems-level research, development and demonstration activities related to aviation safety, environmental impact mitigation, and Next Generation Air Transportation System (NextGen) activities;
- Accelerating development of Tier 1 Earth science climate research missions recommended by the National Academies' decadal survey;
- Increasing the Agency's supercomputing capabilities; and
- Stimulating efforts within the private sector to develop and demonstrate technologies that enable commercial human spaceflight capabilities.

In FY 2011, NASA effectively spent the money entrusted to the Agency by Congress by completing the majority of planned work. As of September 30, 2011, NASA has disbursed over $994 million (94 percent) of its Recovery Act funds available through September 30, 2010 (shown in the chart below). Also of note, NASA contractors and grantees have completed an additional $33.5 million of work to bring the total expenditure to 97.5 percent of the Recovery Act funds. NASA expects to complete the remaining Recovery Act activities by September 30, 2013. The Inspector General funds are not included in the chart below as these amounts are available through September 30, 2013.

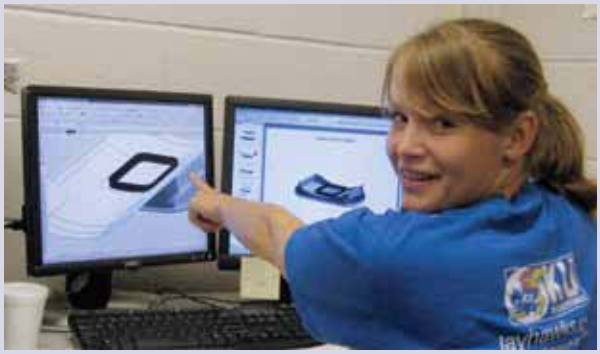


*Ratio compares disbursed amounts to total available resources.

Recovery Act funding supports instrumentation for NASA's IceBridge mission

In 2009, the Center for Remote Sensing of Ice Sheets (CReSIS) at the University of Kansas received Recovery Act funds to participate in NASA's IceBridge mission by helping to provide four specialized radars for the aircraft flying the mission. IceBridge, the largest airborne survey of Earth's polar ice ever flown, is monitoring polar regions with instrumented aircraft until the launch of ICESat-II.

CReSIS developed a radar instrumentation package in less than six months and deployed it on NASA's aircraft. IceBridge used the resulting systems during the 2010 and 2011 deployments to Greenland. The CReSIS team perform measurements in conjunction with laser surface elevation measurements being performed by NASA Centers. Scientists around the world are using the data collected by the instrumentation to improve ice-sheet models. This project provided an excellent opportunity to train both graduate and undergraduate students in a multidisciplinary design environment, and provided them an avenue to learn rapid prototyping and development of hardware that must conform to aircraft certification standards. The project involved a local industry in the development process and also has enabled other joint projects that include local industry.



An aerospace engineering student at CReSIS (top) had the opportunity to see the development progress for the fuselage-mounted Multichannel Coherent Radar Depth Sounder (MCoRDS) instrument from a computer aided structural design to the actual installation on the aircraft. The photo below shows MCoRDS being installed at NASA's Wallops Flight Facility. (Credit, top: CReSIS; below: NASA)

Performance

Results

NASA has a culture of performance and data-driven performance management, as periodically recognized by Congress, the Government Accountability Office, and the Office of Management and Budget. In recent years, the Agency has worked hard to improve its performance management system to increase accountability, transparency, and oversight. NASA continues to add sophistication and discipline to this system, leading to more consistent performance results across NASA's missions and to make the best use of the resources entrusted to the Agency by Congress and the American people.

In FY 2011, NASA said farewell to the Space Shuttle and continues to look forward to future years of performance in all program areas: aeronautics, science, and human space flight. Shortly after the last flight, Administrator Bolden announced a launch vehicle design for a new deep space exploration system to follow the Space Shuttle. This new heavy-lift rocket will be America's most powerful since the Saturn V rocket, which carried Apollo astronauts to the Moon, and it will launch humans to explore new deep-space destinations like asteroids, Mars, and its moons.

The Agency also unveiled six new strategic goals that emphasize the cooperative, cross cutting nature of NASA's missions and operations. They focus on the valued contributions of NASA's science and exploration missions, as well as aeronautic and space technology research.

NASA made improvements to its performance management system with a new performance framework, based on the strategic goals, that uses a revised rating criteria to conduct quarterly reviews of performance goals (including high priority performance goals) and annual performance goals.

This Performance Results section presents:

- A tribute to NASA's Space Shuttle Program in recognition of its contribution to human exploration and in celebration of its successful retirement;
- NASA's new performance framework;
- An explanation of how NASA measures and manages its performance;
- A summary of NASA's performance against its FY 2011 goals;
- The FY 2011 cost toward its strategic goals;
- Performance highlights for each strategic goal; and
- A summary of verification and validation practices for assuring the integrity of NASA's performance data.

End of an Era, Dawn of a New Beginning

The Space Shuttle and Thirty Years of Performance

The Hubble Space Telescope. The International Space Station. The Galileo robotic Jupiter spacecraft. The Chandra X-ray Observatory. Each of these missions has one thing in common: they were made possible by the Space Shuttle. In its 30 years of operation, the Space Shuttle Program accomplished amazing things, advancing technology and affecting the lives of people across the globe.

The Space Shuttle Program was a remarkable chapter in America's history in space. The five orbiters, *Columbia*, *Challenger*, *Discovery*, *Atlantis*, and *Endeavour*, flew 135 times, carrying more than 360 people into space and traveling more than 500 million miles. The Space Shuttle Program was a core part of NASA's strategic plan for over three decades, and this amazing vehicle enabled NASA and the Nation to do great things in space.

NASA's Space Shuttle fleet began setting records with its first launch on April 12, 1981, and continued to set high marks of achievement and endurance through 30 years of missions. Starting with *Columbia* and continuing with *Challenger*, *Discovery*, *Atlantis*, and *Endeavour*, the Space Shuttle fleet carried people into orbit, launched, recovered and repaired satellites, conducted cutting-edge research and built the largest structure ever assembled in space, the International Space Station (ISS). The final Space Shuttle mission, STS-135, ended July 21, 2011, when *Atlantis* rolled to a safe stop at its home port, NASA's Kennedy Space Center in Florida.

In its 30 years of performance, crew members spent a total of 198,728.25 hours (approximately 8,280 days) on Space Shuttle, and deployed 179 payloads. They also returned 52 payloads from space back to Earth. Space Shuttle crews retrieved and repaired then re-deployed seven payloads, including the Hubble Space Telescope and the Solar Max satellite. The Shuttle docked with the *Mir* space station nine times, and with the International Space Station 36 times. The Space Shuttle launched over 4.4 million pounds of cargo mass into space and, unique to the Shuttle, returned almost 230,000 pounds of cargo back to Earth. Collectively, the orbiters spent a total of 1,310 days (31,440 hours, 59 minutes, 33 seconds) in space, orbiting Earth 20,830 times.

In 2004, NASA was given two strategic goals for the Space Shuttle: complete assembly of the ISS and fly safely through their retirement. NASA has completed both these goals. As it did during the first three decades of Space Shuttle flight, the performance of the Space Shuttle Program has always reached for the greatest heights to deliver benefits to all humankind.

Designed to return to Earth and land like a hypersonic glider, the Space Shuttle was the first successful reusable space vehicle. The Space Shuttle pushed the boundaries of discovery ever farther, requiring not only advanced technologies but the tremendous effort of a dedicated nationwide workforce. Thousands of civil servants and contractors across the Nation at NASA's Centers have demonstrated an unwavering commitment to mission success and the greater goal of space exploration.

To this day, the Space Shuttle remains the fastest winged vehicle ever to fly, with an orbital velocity of 17,500 miles per hour, 10 times the speed of a high-powered rifle bullet. Additionally, the Space Shuttle carried cargos of substantial weight and dimensions and ultimately returned from orbit more than 97 percent of all mass returned to Earth.

On April 12, 1981, a bird flies away from Launch Complex 39's Pad A as something new takes to the sky—America's reusable Space Transportation System (STS). Designated STS-1, Space Shuttle *Columbia* launches on its historic maiden voyage carrying astronauts John Young and Bob Crippen. (Credit: NASA)

In addition to the advances required for the spacecraft's development, science has made huge strides with the help of the Space Shuttle. NASA researchers have learned more about how human bodies and those of other organisms function, from the subcellular level on up. They have learned how people as individuals interact with one another under unusual and stressful circumstances—and how to work together. The Space Shuttle has revealed more about Earth, its land masses, oceans, atmosphere, and environment as a whole. It also has been instrumental in learning more about the Moon, the solar system, the Milky Way galaxy, and the universe. For example, Space Shuttle missions launched and repeatedly upgraded and repaired the Hubble Space Telescope, which has provided unprecedented vision of distant stars, some with planets orbiting them. It has allowed humankind to look at objects so distant that viewing the light from them is looking back in time to witness the beginning of the universe.

Astronaut Story Musgrave, anchored on Space Shuttle *Endeavour*'s robotic arm, prepares to be elevated to the top of the Hubble Space Telescope during Hubble's first servicing mission, in 1993. Astronaut Jeffrey Hoffman, inside the Shuttle payload bay, assists Musgrave. The mission replaced and repaired various instruments, but its most important task was installing technology that corrected the tiny flaw in Hubble's main mirror that distorted the telescope's view. (Credit: NASA)

Scientific advances continue aboard the ISS. Without the Space Shuttle, this orbiting research facility simply could not have been built. Perhaps as important as any element of the Space Shuttle legacy is the development of international cooperation in space. Humans from many nations have begun to work together in space. Space Shuttle visits to the Russian space station *Mir* were a beginning that led to the new cooperation we see today aboard the ISS. It has helped to develop understanding for people from many countries, including some former enemies. Such synergies will give humans as a whole greater potential for space exploration and development that any single nation could achieve alone. The Space Shuttle has provided inspiration—for the young and the not so young. It has encouraged uncounted young students to focus on science and technology. The idea of becoming an astronaut, as some certainly will, is a powerful motivation. So too is the prospect of using such an education to advance human knowledge and understanding in space. People of all the nations contributing to the Space Shuttle's design and operation can take pride in its accomplishments.

Now, the Space Shuttle ushers in the next extraordinary installment in the Nation's story of exploration. The Space Shuttle concluded its historic mission by completing construction of the ISS, the anchor of NASA's human space flight activities for the next decade. Six-member crews will be living and working aboard the ISS around the clock until at least 2020. The ISS will be the centerpiece of our human spaceflight activities for the coming years, and the research and technology breakthroughs aboard the ISS will facilitate our travel to destinations beyond low Earth orbit.

Workers measured and marked in bright red the letters "MLG" at the spot where Space Shuttle *Atlantis*' main landing gear came to rest after the vehicle's final return from space. Securing the Space Shuttle fleet's place in history on the STS-135 mission, *Atlantis* safely and successfully rounded out NASA's Space Shuttle Program on the Shuttle Landing Facility's Runway 15 at Kennedy Space Center in Florida. Main gear touchdown was at 5:57:00 a.m. EDT on July 21, 2011, followed by nose gear touchdown at 5:57:20 a.m., and wheel stop at 5:57:54 a.m. (Credit: NASA/K. Herring)

The Space Shuttle Program will continue to shape humankind's vision of exploration. The orbiters will live on in museums around the country, inspiring millions of visitors to look up and dream. Though the orbiters themselves will no longer fly, technology from the Space Shuttle will be used in the design of the Space Launch System, NASA's new deep space launch vehicle. The aspiring astronauts of today may not fly the Space Shuttle, but they may soon have the opportunity to walk on Mars.

On to 30 more years of NASA's performance in human space flight, science, aeronautics, and space technology development. . . .

Above: Vapor trails follow Space Shuttle *Atlantis* as it approaches Runway 15 at the Kennedy Space Center for the final time. *Atlantis* marked the 26th nighttime landing of the Space Shuttle and the 78th landing at Kennedy. It also was the final mission for the Space Shuttle Program. (Credit: NASA/S. Joseph and K. O'Connell)

A New Strategic Plan and Performance Framework

On February 14, 2011, NASA released a new Strategic Plan outlining six new strategic goals. For the first time the Agency has a strategic goal that emphasizes the importance of supporting the underlying capabilities that enable NASA's missions. This addition ensures that resource decisions directly address the balance of funding priorities between missions and the requirements of institutional and program capabilities that enable the missions.

At the heart of NASA's strategic goals remain the core missions of human space exploration, Earth and space science, aeronautics, and technology development. The 2011 Strategic Plan elevates the science and aeronautics missions from sub-goals to strategic goals and once again establishes education and outreach as fundamental Agency activities. NASA's new strategic goals are as follows:

- **Strategic Goal 1:** Extend and sustain human activities across the solar system.
- **Strategic Goal 2:** Expand scientific understanding of the Earth and the universe in which we live.
- **Strategic Goal 3:** Create the innovative new space technologies for our exploration, science, and economic future.
- **Strategic Goal 4:** Advance aeronautics research for societal benefit.
- **Strategic Goal 5:** Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.
- **Strategic Goal 6:** Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contribute to a strong national economy.

Changes to NASA's Performance Framework

NASA revised the performance framework supporting these strategic goals, as well, to increase transparency by providing more insight into the Agency's performance against its mid- and near-term plans. This new framework guided development of the FY 2011 Performance Plan being reported on here and in the full PAR.

The former strategy-performance framework, was based on the 2006 Strategic Plan, and consisted of three levels: strategic goals (and sub-goals), outcomes, and annual performance goals (APGs). The new strategy-performance framework consists of four levels of performance measures, mapped to the strategic goals. The four distinct levels supporting the achievement of the overarching goals are outcomes, objectives, performance goals, and annual performance goals.

Each performance level is associated with a specific timeframe. In the past, the outcome level was associated by any timeframe beyond the annual. In the new framework outcomes reflect NASA's long-term plans for the next 10 to 20 years and beyond. Objectives identify targets that span the next 10 years. Performance goals focus on planned progress over the next two to five years, and include the high-priority performance goals. Lastly, annual performance goals (APGs) align to the annual budget request.

The figure below compares the former performance framework to the new one.

Changes to NASA's Rating Criteria and Rated Performance Measures

In FY 2011, NASA chose to pilot refined rating criteria and to rate only the performance goal (two- to five-year target) and APG (annual target) levels as a measurement improvement strategy. In the past, NASA rated the performance against the APGs and outcomes, the latter of which had an open-ended timeframe and, therefore, targets that potentially would never be accomplished fully. Outcomes continue to perform their intended function as long-term, larger scope steps toward achieving the strategic plans.

NASA measures and communicates its progress toward achieving performance goals and APGs through the ratings below. NASA determines these ratings based on a series of internal assessments that are part of ongoing monitoring of NASA's program and project performance. These ratings are then validated externally with entities such as scientific peer review committees, aeronautics technical evaluation bodies, and the Office of Management and Budget prior to provision in the Performance and Accountability Report.

FY 2011 Pilot Rating Criteria for Performance Goals

Rating	Performance Goal and High Priority Performance Goal
Green (On Track)	NASA achieved or expects to achieve the intent of the performance goal or high priority performance goal (HPPG) within the estimated timeframe. NASA achieved the majority of key activities supporting this performance goal or HPPG.
Yellow (At Risk)	NASA expects to achieve the intent of the performance goal or HPPG within the timeframe; however, there is at least one likely programmatic, cost, or schedule risk to achieving the performance goal or HPPG.
Red (Not on Track)	NASA does not expect to achieve this performance goal or HPPG within the estimated timeframe.
White (Canceled or Postponed)	NASA senior management canceled this performance goal and the Agency is no longer pursuing activities relevant to this performance goal or the program did not have activities relevant to the performance goal during the fiscal year.

FY 2011 Pilot Rating Criteria for APGs

Timeframe: When Will the APG Be Achieved	Rating Criteria for APG Types			Rating
	Single Milestone or Deliverable	Multiple Deliverables, Targeted Performance, and Efficiencies	On-going Activities, Services, or Management Processes	
Current FY as planned.	NASA achieved the event or the deliverable met the intent of the APG within the timeframe.	The program/project reached the stated numeric target.	The intended result of the program/project was achieved as defined by internally held success criteria.	**Green**
Achieve next FY (will not achieve this FY as planned).	NASA did not achieve this APG in the current fiscal year, but anticipates achieving it during the next fiscal year.			**Yellow**
Will not be achieved, but progress was made.	N/A	NASA failed to achieve this APG, but made significant progress as defined by reaching 80% of the target or other internally held success criteria.	The intended results of the program/project were not achieved in this fiscal year, but significant progress was accomplished, as defined by internally held success criteria.	
Will not be achieved.	NASA did not achieve the APG and does not anticipate completing it within the next fiscal year.	NASA achieved less than 80% of the target or other internally held success criteria.	Neither intended results nor significant progress were achieved. The progress toward the APG does not meet standards for significant progress for the internally held success criteria.	**Red**
Will not be achieved due to cancellation or postponement.	NASA senior management canceled this APG and the Agency is no longer pursuing activities relevant to this APG or the program did not have activities relevant to the APG during the fiscal year.			**White**

Managing and Measuring NASA's Performance

NASA's planning and performance management system is an essential part of strategic management and governance. The Agency has an integrated system to: plan strategy and implementation; monitor, assess, and evaluate performance toward commitments; identify issues; gauge the organization's health; and provide appropriate data and information to NASA decision-makers. NASA's performance data provides a foundation for both programmatic and institutional decision-making processes and supports decisions concerning strategy and budget.

NASA's performance system is designed to align with the Agency's internally and externally imposed performance measurement and reporting requirements, tools, and practices, including the Government Performance and Results Act Modernization Act (GPRAMA) of 2010 and Executive Orders 13450—Improving Government Program Performance and 13576—Delivering an Efficient, Effective, and Accountable Government.

NASA's planning and performance management system provides data to Agency management through the following: ongoing monthly and quarterly analyses and reviews; annual assessments in support of budget formulation (for budget guidance and issue identification, analysis and disposition); annual reporting of performance, management issues, and financial position; periodic, in-depth program or special purpose assessments; and recurring or special assessment reports to internal and external organizations.

Reviewing Performance at the Senior Management Level

For over four years, NASA has held the Baseline Performance Review, an Agency-level forum for discussing performance and issues chaired by the associate administrator, who also serves as the chief operating officer. Senior management at the mission directorate, program, project and Center-level present institutional, program and project performance. Actions are assigned accordingly to address any issues. Beginning in 2011, NASA initiated quarterly performance self-assessments for the execution year performance plan commitments (i.e., performance goals and APGs, and progress toward achieving high priority performance goals (HPPGs)). For HPPGs, the goal leaders present their progress overall, including progress towards milestones, risks, and coordination efforts. They also request senior management input if required to keep on track.

Measuring High Priority Performance Goals

Starting in FY 2010, NASA developed and began reporting on a quarterly basis for five HPPGs. In accordance with the GPRA Modernization Act of 2010 and a White House initiative for building a high-performing government, NASA's HPPGs represent challenging, near-term targets that the Agency will reach to benefit the American people in the areas of human exploration, earth science, aeronautics research, and energy management. These five performance goals were chosen by Administrator Bolden for their importance to both NASA's Mission and national priorities (see NASA's FY 2011 Progress Toward the High Priority Performance Goals located in the FY 2011 PAR for more information).

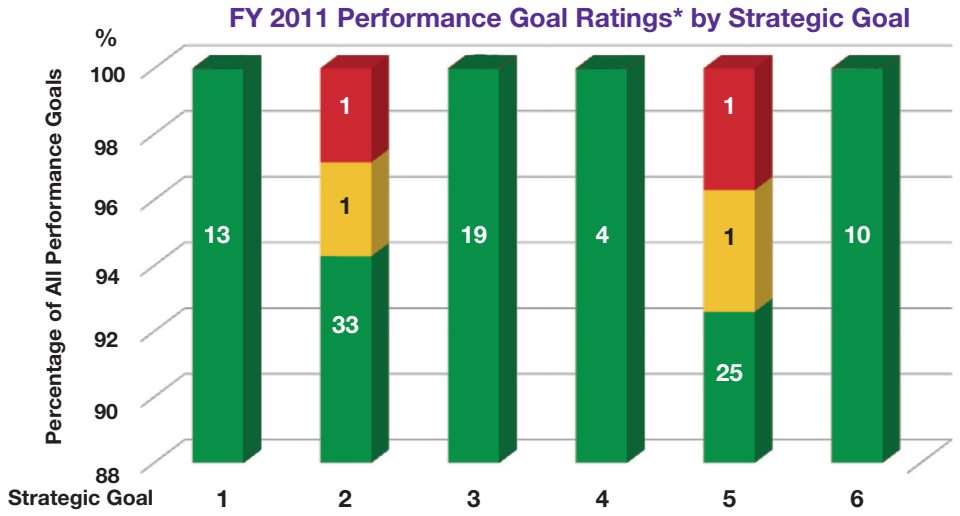
Setting Performance Improvement Plans

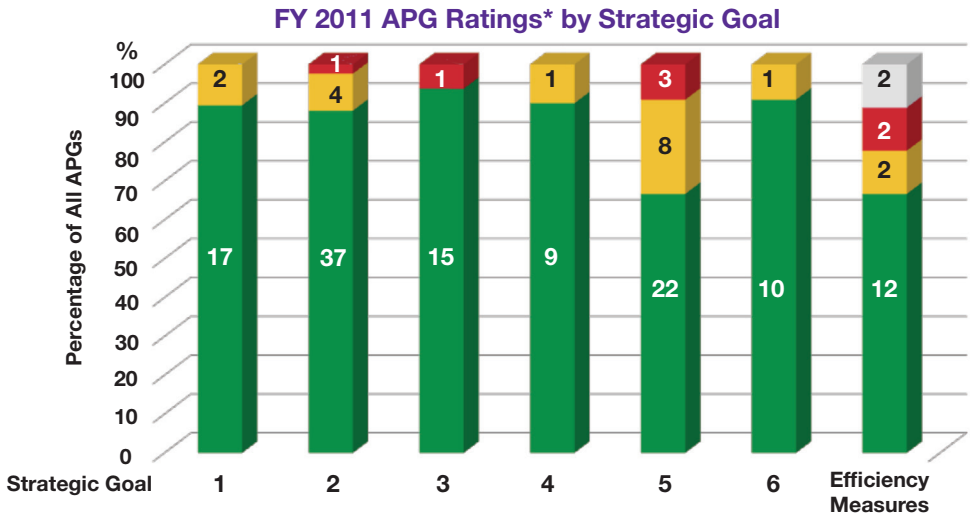
Performance shortfalls identified in FY 2011 can impact the success of activities in subsequent years. Hence, the final performance results reflected here and in the full PAR will inform planning for the forthcoming FY 2012 Performance Plan and the FY 2013 Congressional Justification. NASA, along with the Government Accountability Office (GAO) and the Office of Inspector General (OIG) monitor the Agency's activities and results to identify weaknesses in or risk to performance. NASA assessed this year's performance shortfalls to project future impacts and to look for any trends across those shortfalls. Additionally, FY 2011 performance challenges were trended with those seen in FY 2010, to provide a more complete picture of what may be the causes for why NASA did not meet its performance targets. NASA couples the results from this and other internal performance assessments with the insights of OIG and GAO to inform actionable plans that strengthen the Agency. See the Performance Improvement Plan section for more details on the performance improvement plans resulting from this performance assessment.

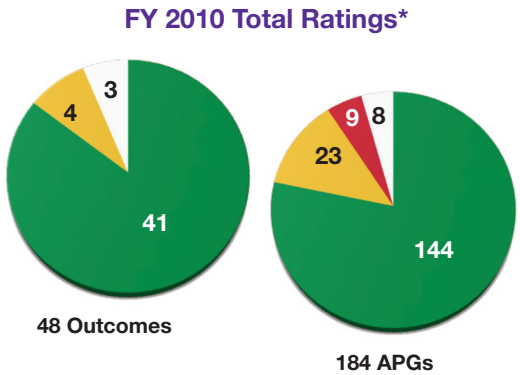
Summary of Performance Results

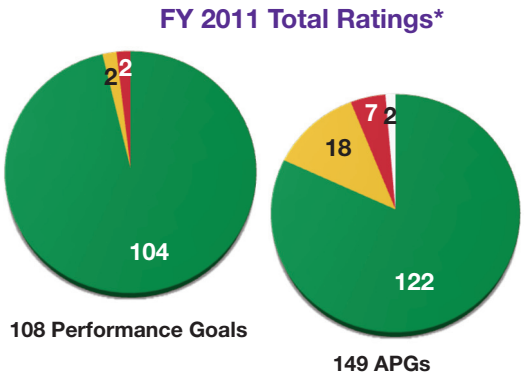
In FY 2011, NASA rated 108 two- to five-year performance goals, including the five HPPGs, and 149 APGs under the new rating criteria. Prior to rating these measures, the FY 2011 Performance Plan was updated to reflect changes due to both Congressional budget action and to correct inaccuracies found in several measures, which were not found prior to the measures' provision in the FY 2012 budget submission to the Congress (available at http://www.nasa.gov/news/budget/index.html). For more details on the changes to NASA's FY 2011 Performance Plan, see Changes to the FY 2011 Performance Plan in the Detailed Performance section located in the FY 2011 PAR.

The summary of NASA's rated measures by strategic goal is provided below.









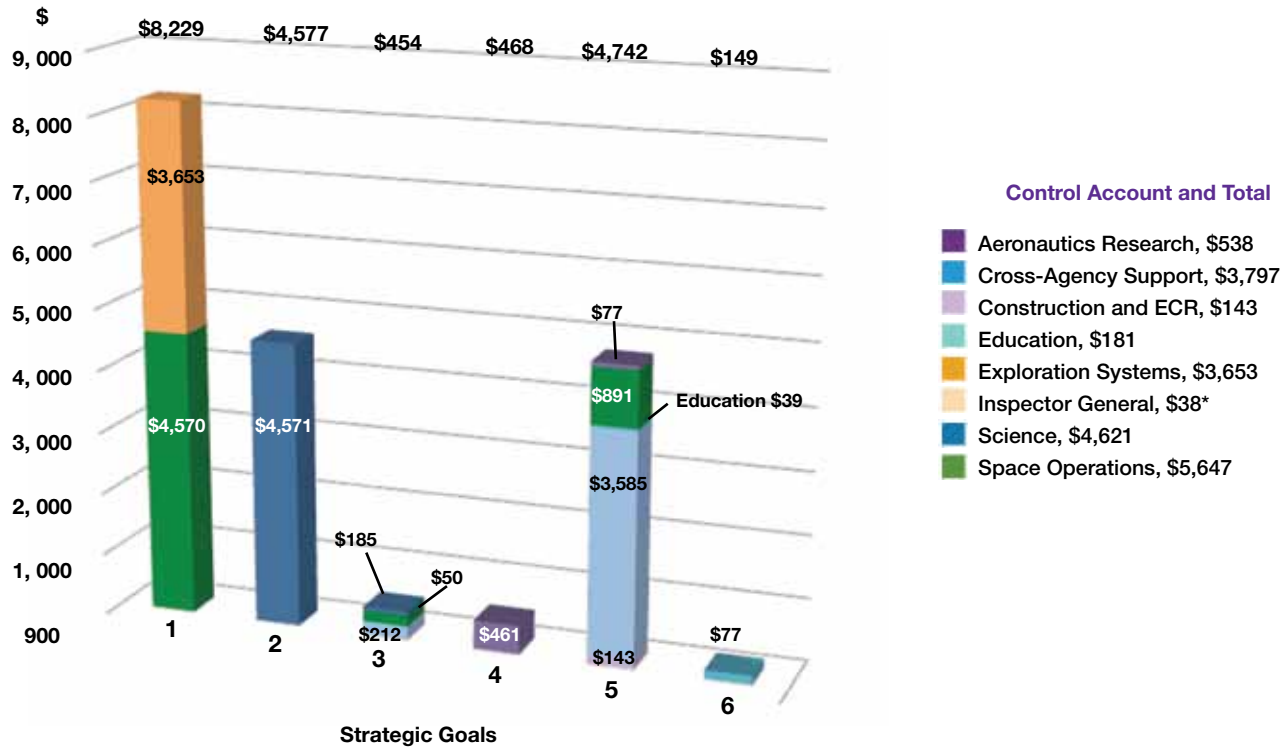
*Numbers denote number of performance measures rated each color.

FY 2011 Cost Toward Strategic Goals

To measure costs incurred toward strategic goals, NASA maps the net costs (per the Statement of Net Cost) to the strategic goals. First, NASA's maps mission directorate, mission support, and Education control accounts, and their supporting programs to the strategic goal to which they contribute. This performance-to-budget alignment is indicated in the Agency's annual performance plan that links each annual performance goal, and responsible program, to the strategic goals. The net costs for each mission directorate or mission support directorate-level control account are then allocated to a strategic goal by the budget-weighted percentage of its programs' contribution to that goal. NASA bases the budget-weighted percentage on the relationship between the programs and control accounts in the fiscal year's final operating plan (this year issued in August) to determine the programs' proportion of budget within the control account.

FY 2011 is the first year where mission support and education activities map directly to a strategic goal. In previous years, the net costs of mission support and education activities were allocated across all strategic goals. The net costs for the Office of Inspector General remain allocated across all strategic goals by an equal amount.

Cost Toward Strategic Goals, Total $18,618
(Dollars in Millions)



*$6 million for Inspector General is allocated to each strategic goal.

Performance Highlights

Strategic Goal 1: Extend and sustain human activities across the solar system.

Humanity's interest in the heavens has been universal and enduring. NASA has had the privilege of extending the Nation's reach beyond the confines of Earth for more than 50 years through robotic and human space exploration.

This fiscal year, NASA took steps to combine the Exploration Systems Mission Directorate and the Space Operations Mission Directorate to form a single organization, the Human Exploration and Operations (HEO) Mission Directorate, which focuses on all aspects of space flight. The new organization will manage a portfolio which includes developing space exploration vehicles and support technologies, obtaining expendable launch vehicles from commercial vendors, managing operation and servicing of the International Space Station (ISS), managing ground operations, and other vital services.

Making the ISS a world-class research facility

FY 2011 was a big year for the ISS. The last flights of the Space Shuttle also marked the final delivery of the large sections that form the living spaces, research laboratories, docking modules, robotic arms, and trusses holding the solar panels.

Discovery (STS-133) delivered the Italian-built Permanent Multipurpose Module (PMM), named Leonardo, that NASA used to ferry supplies, equipment, experiments and other cargo to and from the International Space Station via the Space Shuttle's payload bay. Now it provides more space and accommodations for research. The ISS also received two more Express Logistics Carriers, unpressurized platforms attached to the exterior of the ISS that can be used for research and storage of large replacement parts and systems.

Robonaut 2 is pictured in the ISS Destiny laboratory on August 22 shortly after it was powered up and teams on the ground sent power to the robot for the first time in space. The red flags tied around its wrists are to remind the crew not to use its arms as handles. About a week later, NASA astronaut Mike Fossum, Expedition 28 flight engineer, works with Robonaut 2. (Credit, both images: NASA)

Having completed assembly, ISS mission priorities have shifted from facility assembly to utilization and research. NASA took the first steps in transitioning management of the ISS National Laboratory to an independent non-profit organization by requesting proposals for management of the National Laboratory in February 2011. In August, NASA selected the Center for the Advancement of Science in Space (CASIS), and began transitioning responsibilities. CASIS will help ensure the ISS' unique capabilities are available to the broadest possible cross-section of the U.S. scientific, technological, and industrial communities and will manage research conducted through the National Laboratory.

While the National Laboratory is in transition, the ISS is already being used to develop technologies that will support future objectives in human space exploration. NASA demonstrated advanced robotics technologies and capabilities in February 2011 when ISS crewmembers used the Special Purpose Dexterous Manipulator (SPDM), also known as the Canadarm2 robotic arm, to extract two large external payloads from Japan's H-11 Transfer Vehicle (HTV). In August, ground controllers used the SPDM to change out a piece of failed external hardware without crew participation. Usually, these types of hardware change-outs are performed by a crew member during an spacewalk, requiring up to 26 crew hours to prepare and perform, outside of the safe confines of the ISS. NASA also is using ISS as a platform to demonstrate key robotics technologies needed to meet future human space exploration objectives. Robonaut 2, the first humanoid robot in space, launched in February 2011 aboard STS-133. Co-developed with General Motors (GM), Robonaut's primary job on the ISS is to demonstrate how a dexterous robot can manipulate mechanisms in a microgravity environment, operate safely in the space environment for extended periods of time, assist with ISS tasks, and eventually interact with astronauts. GM plans to use the results in future advanced vehicle safety systems and manufacturing plant applications.

Atlantis (STS-135) delivered the Robotics Refueling Mission (RRM) payload in July and crew members attached it to the outside of ISS. A joint effort between NASA and the Canadian Space Agency (CSA), RRM is designed to demonstrate and test the tools, technologies, and techniques needed to robotically refuel satellites in space—even satellites that were not designed to be serviced in orbit. Payload operations for RRM are planned to begin in FY 2012. Another significant enhancement to the ISS research program in FY 2011 included the delivery of the Alpha Magnetic Spectrometer (AMS), which was delivered in May on *Endeavour* (STS-134). The AMS is a state-of-the-art particle physics detector developed by an international team of 56 institutions from 16 countries. At 15,000 pounds, AMS is the largest scientific payload on the ISS. The AMS experiment will use a large permanent magnet to search for antimatter, dark matter, and dark energy to advance knowledge of the universe and lead to a better understanding of the universe's origin. More information on the many ISS experiments conducted during each Expedition can be found at http://www.nasa.gov/mission_pages/station/main/index.html.

NASA announces new homes for Shuttles

On July 21, 2011, STS-135 touched down at Kennedy Space Center in Florida, ending the last Space Shuttle flight. But it did not mark the end of the Space Shuttle fleet's place in history. On April 12, NASA Administrator Charles Bolden announced the facilities where the four Space Shuttle orbiters will be on permanent display.

Enterprise, the first orbiter built, will move from the Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center in Virginia to the Intrepid Sea, Air and Space Museum in New York. While *Enterprise* never flew into space; NASA used it for approach and landing tests in 1977. The Udvar-Hazy Center will become the new home for *Discovery*, which retired after completing its 39th mission in March 2011. *Endeavour*, which ended its last flight on June 1, will go to the California Science Center in Los Angeles. Finally, the Shuttle that flew STS-135, *Atlantis*, will take its place of pride at the Kennedy Space Center Visitor Complex in Florida. (Read about other awarded artifacts.)

At the Kennedy Space Center, Space Shuttle Program crews are prepping the orbiters for transfer to their new homes. Prior to their relocation, technicians and engineers are delving deep into the spaceframe, areas that have not been seen in a while because it would have been too invasive. The teams are pulling out components, conducting inspections, and creating a detailed encyclopedia to pass on to future spacecraft designers. Then the crews will put the components back in place. They will remove the Shuttles' engines and replace them with dummy engine nozzles, keeping the real hardware for further study. They also will remove parts that contain harmful elements. After completing these changes, NASA will deliver the Shuttles looking just as they did the last time they flew.

Next step in space exploration

This fiscal year, NASA announced the design of the key elements that will provide initial capability for crewed exploration beyond Earth.

In May 2011, NASA announced that the Multi-Purpose Crew Vehicle (MPCV) will be based on designs originally planned for the Orion Crew Exploration Vehicle. The spacecraft will have a pressurized volume of 690 cubic feet, with 316 cubic feet of habitable space and eventually will provide the habitable volume for missions beyond low Earth orbit.

As the fiscal year drew to a close, NASA looked toward the future with the announcement of its design for a heavy-lift rocket. Called the Space Launch System (SLS), the rocket will be America's most powerful launch vehicle since the Saturn V that carried Apollo astronauts to the Moon. This heavy-lift rocket will be capable of launching humans to new destinations beyond Earth orbit, including to asteroids and Mars.

The decision to build the SLS is the culmination of a months-long, comprehensive review of potential designs to ensure that the Nation gets the best possible rocket for the investment—one that is powerful and evolvable, so that NASA can adapt it to different missions as opportunities arise and new technologies are developed.

MPCV sits in Lockheed Martin's Vertical Testing Facility where it is being assembled and tested. (Credit: Lockheed Martin)

Strategic Goal 2: Expand scientific understanding of the Earth and the universe in which we live.

NASA's work toward achieving Strategic Goal 2 covers the solar system, from the Sun to the outermost edge of the heliosphere, where the Sun's influence ends, and beyond to the distant reaches of the universe. It includes applications that are part of daily lives, like weather reports and natural hazards monitoring, and science that answers big, fundamental questions: How did life on Earth begin? Is there life elsewhere? How and why are Earth's climate and environment changing? How did stars, planets, and galaxies form and evolve?

The Science Mission Directorate conducts this work through four science themes: Earth Science, Heliophysics, Planetary Science, and Astrophysics. Below are FY 2011 highlights from these themes.

Research shows how massive glaciers move

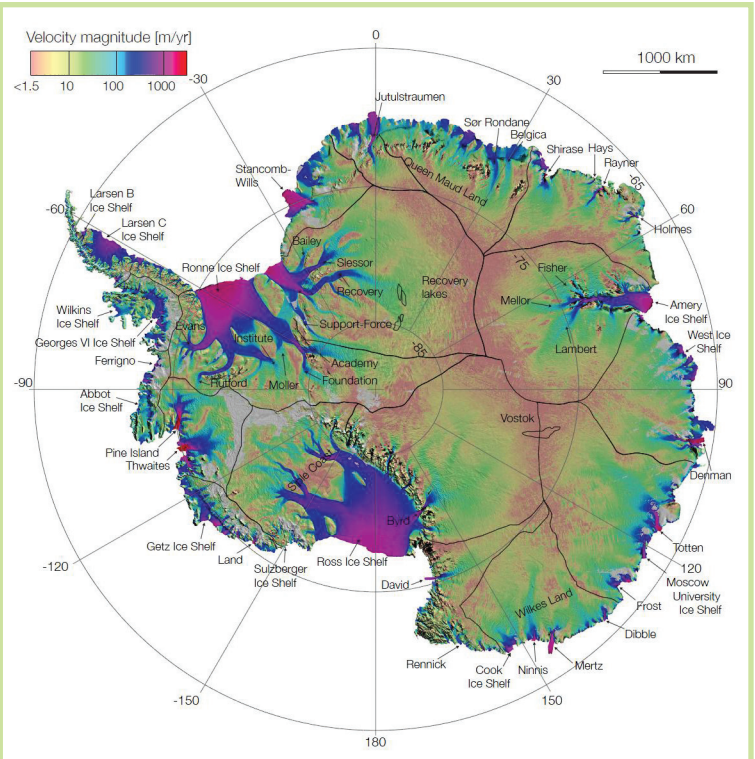
Scientists have not had a clear picture of Antarctic ice-sheet motion at the continental scale—until now. NASA-funded scientists have assembled a comprehensive, high-resolution, digital mosaic of ice motion in Antarctica that confirms some well-know behavior, but also reveals a wealth of new information.

The vast extent of East Antarctica, representing about 77 percent of the continent, has been devoid of quality data. Only a few floating ice shelves have been mapped, and comprehensive velocity mapping has been limited to the lower reaches of key outlet glaciers. This lack of broad-scale detailed observations of ice motion has limited scientists' ability to create numerical models of ice-sheet evolution. These types of models help scientists predict ice loss, sea level changes, climate and weather changes, and other related effects.

This recent, comprehensive survey of Antarctica was obtained using 900 satellite tracks and more than 3,000 orbits of radar data collected during the International Polar Year, dedicated to scientific research of the Arctic and Antarctica. The data came from a variety of orbiting interferometric synthetic aperture radar (InSAR) instruments, including RADARSAT-2 (Canada), Envisat Advanced Synthetic Aperture Radar, or ASAR (Europe), Advanced Land Observing Satellite (ALOS) Phased Array type L-band Synthetic Aperture Radar, or PALSAR (Japan) and the European Remote Sensing (ERS) 1/2 satellite (Europe). Each instrument contributed unique coverage and performance.

The data showed that ice velocity ranges from about an inch a year near ice divides to a couple of miles a year on fast-moving glaciers and floating ice shelves. The distribution of velocities has one peak at 13 to 16 feet a year for the slow-moving ice in East Antarctica and another peak at 812 feet (250 meters) a year for fast-flowing glaciers and ice shelves. The scientists found the highest velocities at the Pine Island and Thwaites glaciers of West Antarctica, with rates several times those of any other glacier. This sector of the ice sheet is undergoing the most rapid change at present, over the widest area, and with the greatest impact on the total ice-sheet mass balance.

The mosaic also provides insight into preferred channels of ice transport. It reveals that every major glacier is the merger of several tributaries that extend hundreds of miles inland. The scientists note that in the Antarctic peninsula, the velocities of the tributaries of Wilkins Ice Shelf and



The color-coded map, done on a logarithmic scale and overlaid on a MODIS mosaic of Antarctica, shows the areas of highest ice sheet movement velocities in red and blue, with red exceeding 3,250 feet (1,000 meters) a year. The lowest velocities are in orange and yellow. The black lines delineate ice divides and subglacial lakes. The fast-moving Pine Island and Thwaites glaciers are at center left. The Wilkins and Georges VI ice shelves are on the peninsula at upper left. (Credit: NASA/JPL-Caltech/UCI)

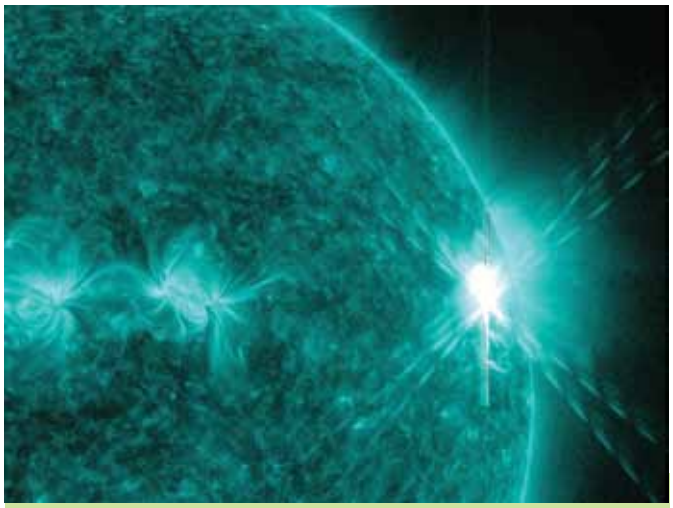
of the northern sector of George VI Ice Shelf abruptly transition to zero when they mix with the floating ice shelves, where ice-shelf melt is greatly increased by the underlying warm ocean.

The observation that ice flow in Antarctica is driven by a complex set of meandering, size-varying, speed-varying, intertwined tributaries—most likely dominated by basal-slip motion, when the weight of a glacier exerts enough pressure to melt the ice where it touches the ground, forming a lubricant—challenges the traditional view of ice-sheet flow constrained by internal deformation, and disconnected from coastal regions. Since this latter view has usually been adopted as the basis for continental-scale ice-sheet modeling, the new reference map will help to improve reconstructions of past and ongoing changes in Antarctica, as well as predictions of future ice-sheet evolution in a warming climate. A paper, Ice Flow of the Antarctic Ice Sheet, about the reference map and related findings was published by *Science* online August 18, 2011.

Spacecraft watches the Sun wake from a long solar minimum

As 2011 unfolded, NASA's Solar Dynamics Observatory (SDO) monitored as the Sun has "woken" from the deepest solar minimum in nearly a century. On February 15 and again on March 9, SDO detected a pair of "X-class" solar flares—a powerful kind of x-ray flare. The last such eruption before February 2011 occurred in December 2006. Another eruption on March 7 hurled a billion ton cloud of plasma away from the Sun at five million miles per hour. The rapidly expanding cloud was strong enough to deliver enough energy into Earth's auroral zone to send the Northern Lights into the lower latitudes of Wisconsin, Minnesota, and Michigan.

Beginning in 2008, sunspots all but vanished, solar flares subsided, and the Sun was eerily quiet. These solar minima come along every 11 years or so as a natural part of the solar cycle, but this particular solar minimum lasted much longer than usual. SDO provides continual full-disk coverage of the Sun at higher resolution, so researchers are able to closely follow changes in solar activity as part of their effort to better understand the Sun's effect on the space environment. With the return of sunspots will come more solar activity including X-class flares and the return of solar maximum, likely in 2013. (Find out more about X-class solar flares.)



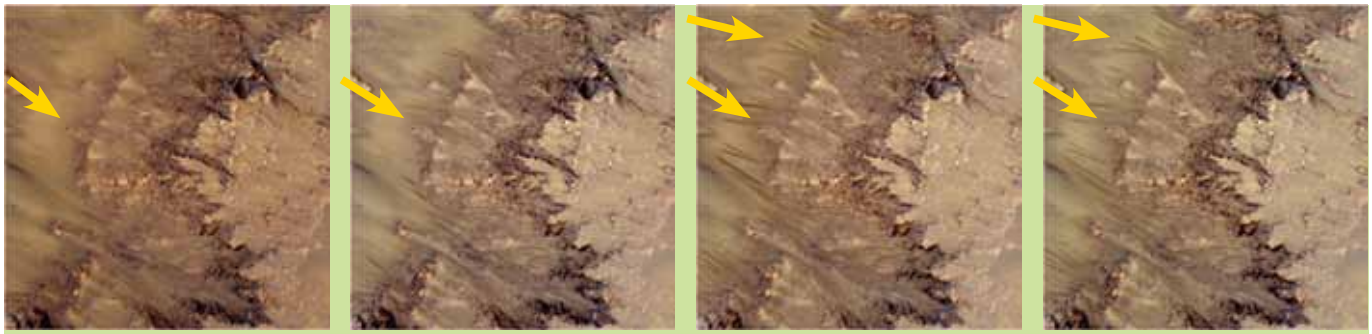
On August 9, 2011, the Sun emitted an X6.9 (an X-class) flare, as observed here by SDO in extreme ultraviolet light. These gigantic bursts of radiation are often associated with solar eruptions known as coronal mass ejections that can cause geomagnetic storms. Effects of these storms can cause disturbances in the uppermost atmospheric layers, which disrupt GPS and communications signals. (Credit: NASA)

Researchers have identified the consequences of the quiet Sun in every part of the heliophysics regime. These include the highest fluxes of cosmic rays recorded by near-Earth spacecraft and extremely low densities of the upper atmosphere that extends the life of potentially harmful space debris in low-Earth orbit. NASA sponsored a research workshop on the Causes and Consequences of Solar Cycle 24. Many processes driven by solar disturbances were considerably quieted during this solar minimum, providing a rare opportunity to study the heliophysics system in an almost "background" state. Many different systems were affected, but one characteristic that all seem to share is that there is more significant coupling between regions than previously thought.

New evidence suggests water flowing on Mars

Data collected by NASA Mars missions indicate that water probably flowed across ancient Mars, but whether it exists on the surface today is a topic of debate. However, a new sequence of images taken by the Mars Reconnaissance Orbiter (MRO) show linea—narrow, dark streaks on steep slopes—that appear and incrementally grow during warm seasons and fade in cold seasons, indicating that they are formed by liquid water moving down-slope on or near the surface.

The linea extend down from bedrock outcrops, with hundreds of them forming in some rare locations. They appear and lengthen in the late southern spring and summer, when peak surface temperatures range from approximately 250 to 300 kelvin (-10 to 80 degrees Fahrenheit). Liquid brines near the surface might explain this activity, but researchers do not understand the exact mechanism and source of water. This work is important to NASA's objective to understand the processes that determine the history and future of habitability of Mars. (Read more on this story.)



Recurring slope linea do not appear in late winter (first from left). By early spring (second), the slope shows the beginning of the linea, visible as dark parallel lines. Mid-summer (third) shows dramatic, high-contrast linea, which begin to fade in the fall (forth, on the right). (Credit: NASA/JPL-Caltech/Univ. of Arizona)

Firsts beyond the solar system: planet orbiting two suns and a carbon-rich planet

The existence of a world with a double sunset, as portrayed in the film *Star Wars* more than 30 years ago, is now a scientific fact. NASA's Kepler mission has made the first unambiguous detection of a circumbinary planet—a planet orbiting two stars—200 light-years from Earth. Unlike *Star Wars*' Tatooine, the planet is cold, gaseous, about the size of Saturn and not thought to harbor life, but its discovery demonstrates the diversity of planets in the Milky Way galaxy. Kepler detected the planet, officially known as Kepler-16b, by observing transits, where the brightness of a parent star dims from the planet crossing in front of it. The parent stars are smaller than Earth's Sun. One is 69 percent the mass of the Sun and the other only 20 percent. Kepler-16b orbits around both stars every 229 days, similar to Venus' 225-day orbit, but lies outside the system's habitable zone, where liquid water could exist on the surface because the stars are cooler than Earth's Sun. Kepler's mission is to search for Earth-sized planets in or near habitable zones. (Read more about this story.)

NASA's Spitzer Space Telescope observed a huge, searing-hot planet, orbiting a single star, loaded with an unusual amount of carbon. The planet, a gas giant named WASP-12b, is the first carbon-rich world ever observed. Carbon is a common component of planetary systems and a key ingredient of life on Earth. None of the planets in Earth's solar system is known to have more carbon than oxygen, though this ratio is unknown for Jupiter, Saturn, Uranus, and Neptune. Unlike WASP-12b, these planets harbor water—the main oxygen carrier—deep inside their atmospheres, making the oxygen hard to detect and quantify. WASP-12b has excess carbon, some of which is in the form of atmospheric methane. Curiously, the parent star itself has a carbon-to-oxygen ratio that is similar to that of the Sun. How the planet became enriched in carbon relative to its parent star is an unsolved mystery that NASA will investigate as it continues to pursue the objective to generate a census of extrasolar (beyond the solar system) planets and measure their properties. (Read more about this story.)

Strategic Goal 3: Create the innovative new space technologies for our exploration, science, and economic future.

NASA's technology development programs advance mission capabilities and effectiveness, enable scientific discovery, and improve the capabilities of other government agencies and the aerospace industry. NASA's work toward achieving this strategic goal addresses three categories of technology investments that will span the technology readiness level (TRL) spectrum.

The first set of technology investments focuses on fostering early-stage innovation in which a multitude of concept technologies are developed through a process of idea generation, research, innovation, and experimentation.

The second category focuses on taking the best low-TRL technologies (those studied under the first category) and determining which of these potentially "game changing" innovations and technologies are viable through further technology development, prototyping, experimentation, testing, and demonstrations.

The third type of technology investment supports technology development targeting near-term, unique spacecraft or mission needs. Through focused studies, dialogue, and development activities across NASA, as well as with academia and industry, these technology activities will provide improved future technologies that are closely aligned with known requirements.

NASA's new Space Technology Program gets off to a great start

In FY 2011, the Office of the Chief Technologist (OCT) inaugurated its Space Technology Program portfolio, which focuses on developing and demonstrating advanced space systems concepts and technologies to enable NASA's missions. Below are some of the accomplishments from the first year.

In 2008, Congress directed the National Academies to conduct a review of the effectiveness of the NASA Institute for Advanced Concepts (NIAC), which served Agency needs from 1998 to 2007. Based on the National Academies' recommendations and the results of an October 2009 hearing by the U.S. House of Representatives Subcommittee on Space and Aeronautics, NASA re-established NIAC—now called the NASA Innovative Advanced Concepts Program. During the fiscal year, NIAC made its first 30 awards for early investments and partnerships with creative scientists, engineers, and citizen inventors from across the Nation. These investments have the potential to pay huge technological dividends and help maintain America's leadership in the global technology economy. (Read more about the selected 30 proposals.)

NASA conducted the Green Flight Centennial Challenge, created to inspire the development of more fuel-efficient aircraft and spark the start of a new electric airplane industry. The winning teams, which were both electric powered, shattered the fuel efficiency requirement by achieving about twice the required passenger miles per gallon. NASA has awarded the largest prize in aviation history to the first place team, which developed an electric-powered aircraft that flew 200 miles using a little over a half-gallon of fuel equivalent per passenger.

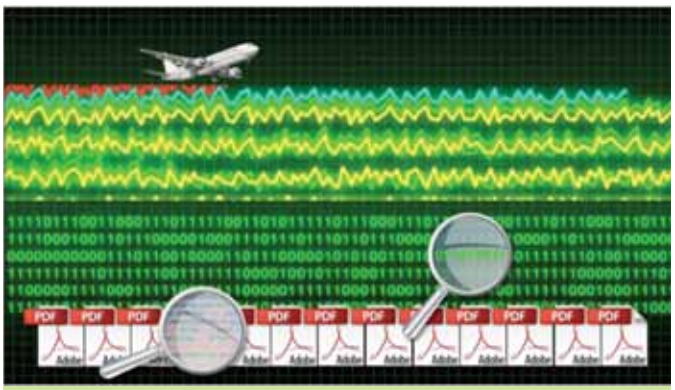
NASA implemented a Space Act Agreement with the Colorado Association for Manufacturing and Technology (CAMT) in December 2010 to promote the commercialization of technology developed for the space program through the creation of a Technology Acceleration Program and Regional Innovation Cluster for Aerospace and Clean Energy. The NASA–CAMT partnership will help companies bridge the gap between prototype design, manufacturing, and commercialization, while identifying commercial applications for NASA technologies. (Read more about this story.)

NASA Deputy Administrator Lori Garver (front right) and Elaine Thorndike, chief executive officer of CAMT sign historic Space Act Agreement at the Colorado State Capitol Building in Denver to promote the commercialization of technology developed for the space program. (Credit: NASA)

In the area of Crosscutting Capability Demonstrations, NASA selected three Technology Demonstration Missions projects to transform space communications, deep space navigation, and in-space propulsion capabilities. These crosscutting flight demonstrations—a space solar sail, a deep space atomic clock, and a space-based optical communications system—have potential to provide tangible, near-term products and to infuse high-impact capabilities into NASA's future space operations missions and other U.S. government and commercial space activities. (Read more about the selections.) NASA made key steps to foster the development of the commercial reusable suborbital transportation industry in August 2011, an important step in the longer-term path that envisions suborbital reusable launch vehicles evolving to provide the Nation with much lower-cost, more frequent, and more reliable access to orbital space. NASA selected seven companies to integrate and fly technology payloads on their commercial suborbital reusable platforms, which will carry payloads near the boundary of space. NASA will draw from this pool of commercial space companies to deliver payload integration and flight services as part of the Flight Opportunities Program. (See the list of chosen providers.) Through this catalog approach, NASA is moving toward the goal of making frequent, low-cost access to near-space available to a wide range of engineers, scientists and technologists. The government's ability to open the suborbital research frontier to a broad community of innovators will enable maturation of the new technologies and capabilities needed to enhance future activities in space.

Strategic Goal 4: Advance aeronautics research for societal benefit.

A key enabler for American commerce and mobility, U.S. commercial aviation is vital to the Nation's economic well-being. NASA's aeronautics research contributes significantly to air travel innovation by exploring early-stage concepts and ideas, developing new technologies and operational procedures through fundamental research, and demonstrating the potential of promising new vehicles, operations, and safety technology in relevant environments. To achieve this strategic goal, NASA focuses on the most appropriate cutting-edge research and technologies to overcome a wide range of aeronautics challenges for America's current and future transportation system.



A NASA data mining algorithm allows analysts to probe an extensive repository containing different data types, including continuous and discrete flight data and text records. Subject matter experts can take a closer look at any anomalous sequences detected by the algorithm to determine if a possible safety issue exists. (Credit: NASA)

NASA supports safer flight operations

Anomalous flights contain data points that are significantly different from other comparable flights. These events, known as anomalies, could be a pilot configuring the airplane for landing (setting flaps and gear) at an inappropriate time, excessive maneuvering close to the ground, or unexpected readings from an airplane system. Anomalies may signify operationally significant events that can have a potential impact on flight safety. However, they are contained within massive data sets and it would be too time consuming for human analysts to find them without support from highly capable algorithms. NASA's Aviation Safety Program is developing data mining algorithms that will detect anomalous flights from within these large datasets, helping analysts identify potential safety issues and conduct targeted studies. Currently when an algorithm detects a statistically significant anomaly, a human subject matter expert reviews the event to determine if it is operationally significant. This step ensures that a potential issue discovered by the algorithm could actually affect flight safety. If an analyst confirms a possible problem, an airline may consider multiple mitigation paths to prevent it from recurring or minimize its safety impact.

This fiscal year, the Aviation Safety Program developed an algorithm that incorporates the novel approach of concurrently considering three different data types: discrete (event-driven), continuous, and text records. The goal is to develop data-driven anomaly detection algorithms that can quickly identify the anomalous flights to narrow the analyst's attention to those relatively few flights that could contain operationally significant anomalies. The algorithm, developed as part of this work, is able to perform this task by using flight-recorded data and, when available, associated text reports. Flight recorders provide discrete variables—typically representing pilot-controlled inputs such as flap position and warnings such as low oil pressure—and continuous variables—usually representing measurements such as altitude, airspeed, and vertical speed. The text reports are provided by pilots, cabin crew, or others associated with the flight, and typically discuss problems that occurred during the flight. The algorithm is scalable, and therefore, can be supplied with a large volume of flight data.

So far, the Aviation Safety Program has tested up to 177,000 flights, using data supplied by industry partner EasyJet. Based on indications provided by the French aerospace research agency, ONERA, and by a retired pilot who provides consultation, they identified three types of operationally significant anomalies present in the flight data. The Aviation Safety Program also found that the new algorithm improved significantly upon a prior algorithm, identifying all anomalies previously identified, as well as several additional operationally significant anomalies, including altitude deviation, flap speed exceedance, and unstable approach. Additionally, the new algorithm's execution time was no more than five percent greater than the execution time of an earlier algorithm, so the inclusion of text records does not lead to a significant execution time penalty.

Going forward, the Aviation Safety Program plans to test the algorithm on even larger datasets. In FY 2012, it will conduct a test on a large 10 terabyte file to determine whether the algorithm can still detect statistically and operationally significant anomalies. This file size is consistent with those available by commercial airlines and through the Federal Aviation Administration-run Aviation Safety Information Analysis and Sharing (ASIAS) System. As an ultimate goal, the program wants analysts to be able to mine the extensive data fields to uncover new areas of potential safety issues that the aviation safety community has not previously considered.

Strategic Goal 5: Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.

Successful missions are enabled by mission support offices, which provide program capabilities and institutional capabilities. NASA's program capabilities, which are focused on meeting multiple complex programmatic objectives, encompass NASA-unique facilities, management of scientific and engineering workforce, and the equipment, tools, and other required resources. The institutional capabilities encompass a broad range of essential technical and non-technical corporate functions for the entire Agency, such as safety and mission assurance, security capabilities, information technologies, and human capital management.

At the newly remodeled Launch Control Center's Young-Crippen Firing Room at NASA's Kennedy Space Center, engineering directorate personnel demonstrate the recently added Space Command and Control System, which will be used for launches of future human spaceflight vehicles. In use since the Apollo era, the Firing Room was rewired and received new equipment and furnishings. (Credit: NASA/J. Grossmann)

Facilities for the future

NASA's physical infrastructure is critical to enable mission success. However, numerous analyses have concluded that NASA facilities are no longer suitable to meet current and future requirements. During 2011, NASA made significant progress in identifying and implementing a strategy that will enable the Agency to evolve toward the most efficient retention, sizing, and distribution of facilities, laboratories, test capabilities, and other infrastructure consistent with NASA's missions and mandates.

Such evolution includes identifying and removing unneeded or duplicative infrastructure. NASA completed Phase I of the NASA Technical Capabilities (NTC) Assessment Task, which put into place a new process and a new database tool that will help NASA balance institutional capabilities with the needs of NASA's future missions. The process and tool enable an integrated assessment of the supply of technical capabilities across all NASA Centers with the demand for technical capabilities across all NASA programs, relating the required resources associated with a capability to program funding and workforce requirements. The value of this new approach was demonstrated at a 2011 Agency-level Technical Capability Forum, where NASA resolved a significant number of supply and demand gaps.

The NTC Assessment Task has laid the groundwork necessary for NASA to arrive at long-term facilities solutions that will preserve and provide the institutional resources needed to support NASA's evolving mission.

NASA buildings are green

Kennedy Space Center rang in 2011 with the grand opening of NASA's "greenest" facility on January 20. As the new hub for fueling spacecraft on journeys to unlock the mysteries of the universe, the Propellants North Administrative and Maintenance Facility will use natural resources to power buildings and vehicles at Kennedy. More than 300 photovoltaic panels on the roof are expected to generate more energy than the facility will need, making it NASA's first net-zero facility. The new facility also will become a test bed for more environmentally friendly projects at NASA Centers by making sure every aspect is truly green.

Part of the parking lot at the Propellants North facility is tailor-made for electric cars. The covered area features plug-in stations for electric vehicles. (Credit: NASA/F. Michaux)

The facility qualifies for the U.S. Green Building Council's (USGBC's) Leadership in Environmental and Energy Design, or LEED, Platinum status, which is the highest of green building certifications. That certification system is based on scores generated by a point system in which the USGBC rates construction. The construction is rated in several environmentally friendly areas, including the use of sustainable sites, materials and resources, water and energy efficiency, indoor environmental quality, and design innovation.

In June, the Langley Research Center was pleased to find out that its new headquarters building also received a "Platinum" status—the highest rating—from the LEED program. It's the first of a planned $330 million program to replace and upgrade center facilities with the future in mind. The building, called Building 2101, had 52 points, just inside the platinum scale.

Strategic Goal 6: Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation and contribute to a strong national economy.

NASA's missions are a natural means of interacting with the public and supporting students and teachers. Through the excitement of missions and activities, NASA helps stimulate student interest and achievement in science, technology, engineering, and mathematics (STEM) fields. STEM-focused educators use their skills to motivate student achievement and spur creative and critical thinking both in and out of the classroom. In developing student interest and skills, future workers will be prepared to solve technical challenges that benefit the Nation and improve the quality of life on Earth. Furthermore, an American public that is knowledgeable and interested in science, aeronautics, and exploration will value the impact of advances in these fields that help maintain global competitiveness and a robust economy.

To achieve this strategic goal, NASA Education and the Office of Communications partner with the mission directorates and offices within the Mission Support Directorate, other government agencies, non-profit organizations, academia, and industry.

Education Design Team recommendations set the course for the future of NASA education

After several months of intense effort this fiscal year, the Education Design Team (EDT) completed its mission in January 2011 by issuing its final report. The EDT report contained several recommendations for the development of a new, sustainable, and innovative science, technology, engineering, and mathematics (STEM) education program at NASA. Once implemented, these recommendations will enable NASA to do its part to ensure there are highly educated students in the Nation's STEM pipeline, allowing the United States to compete, prosper, and be secure in the 21st century global community (read report PDF).

Chartered by the NASA Administrator and deputy administrator, the EDT was composed of 12 members chosen from the Office of Education, mission directorates, mission support offices, and Centers based on their depth of knowledge and education expertise. The EDT charter called for an evaluation of the Agency's education programs within the context of current trends in education.

In July, NASA celebrated the 25th anniversary of its longest running internship program, the Langley Aerospace Research Summer Scholars (LARSS) project. As part of the celebration, interns toured facilities at Langley Research Center, including the wind tunnel shown here. LARSS helps to preserve U.S. leadership in aeronautics and space science by producing a well-educated, well-trained, and diverse engineering and science workforce. LARSS has served as a first-of-its-kind model for internship, mentoring, and development programs at other NASA centers and was recently ranked sixth on the list of "10 Best Internships for 2011" by Vault Career Intelligence. (Credit: NASA)

The EDT used a systems design approach, using top-level requirements to analyze all parts of the existing NASA education system to identify opportunities for improvement. By taking into account national education priorities and goals, Administration guidance, Congressional direction, as well as insight from nationally recognized education experts, the EDT critically evaluated NASA's existing education efforts. The resulting outcome was six recommendations intended to improve the impact of NASA's Education Program. The EDT's three programmatic recommendations were:

- Focus the NASA Education Program to improve its impact on areas of greatest national need.
- Identify and strategically manage NASA Education partnerships.
- Participate in national and state STEM education policy discussions.

Their three organizational recommendations were:

- Establish a structure to allow the Office of Education, Centers, and mission directorates to implement a strategically integrated portfolio.
- Expand the charter of the Education Coordinating Committee to enable deliberate education program design and evaluation.
- Improve communication to inspire learners.

Since the acceptance of the EDT recommendations by the NASA associate administrator for Education in February 2011, multiple cross-Agency teams comprised of education stakeholders, including representatives from the Headquarters Office of Education, Center Education offices, and mission directorates, have been aggressively working to develop an implementation plan. The EDT's recommendations have provided a foundation for improving NASA's educational offerings, which will allow the Agency to play a leading role in inspiring student interest in STEM disciplines through its unique workforce, facilities, research and innovations.

Verification and Validation of NASA's Performance Information

Verification and validation processes ensure that performance goals are measurable, with a direct connection to an Agency's mission, and that performance data is accurate, complete, consistent, and current. NASA has verified and validated that the Agency's mission directorates and mission support offices have procedures in place for collecting, maintaining, and processing accurate performance data and can assure Congress and the public that reported performance information is credible.

Each mission directorate, including each office within the Mission Support Directorate and the Office of Education, has a process in place for assessing performance and assigning ratings to their performance goals and annual performance goals. Program officials submit to NASA management the supporting performance information that justifies each rating in accordance with NASA's internal quarterly performance reporting process. NASA conducts additional reviews and evaluations of reported performance data to assess whether the information submitted is consistent with information reported at other internal reviews, or assessments by external independent entities, and complete enough to portray an accurate picture of NASA's performance. This annual performance reporting and verification process culminates in the PAR.

Financial Results

This section analyzes and discusses NASA's financial statements and its stewardship of the resources provided to NASA by Congress to carry out its Mission. The financial statements, which present the results of NASA's operations and financial position, are the responsibility of NASA's management.

NASA's financial statements and accompanying notes are presented in their entirety in the Financials section located in the FY 2011 PAR. NASA prepares the Consolidated Balance Sheet, Consolidated Statement of Net Cost, Consolidated Statement of Changes in Net Position and Combined Statement of Budgetary Resources, which provide the financial results of operations. This overview focuses on the key information provided in the statements, which describes NASA's stewardship of the resources provided to it by Congress to carry out its mission.

Financial Highlights

Results of Operations

NASA's net cost of operations for FY 2011 was $18.6 billion, a decrease of $2.7 billion, or thirteen percent compared to FY 2010. This decrease primarily represents reduced activity in FY 2011 for the International Space Station (ISS) and Space Shuttle Program (SSP). Most of NASA's Research and Development and Other Initiatives (R&D/Other) emphasized programs are essential to achieving various strategic goals.

NASA's programs and activities are carried out through four R&D/Other initiatives: Aeronautics Research, Exploration Systems, Science, and Space Operations. The Consolidated Statement of Net Cost presents NASA's net costs by R&D/Other initiatives, which is summarized in the table below. The net cost of operations is the gross cost incurred by NASA, less any earned revenue for work performed for other government organizations and the public.

Science and Space Operations initiatives had the largest net costs in FY 2011 at $6.0 billion and $7.2 billion, respectively. The accompanying table provides net cost comparisons for FY 2011 and FY 2010 across the four major initiatives.

Cost by Research and Development and Other Initiatives

(In Millions of Dollars)

R&D/ Other Initiatives	Audited 2011	Audited 2010	% Change
Aeronautics Research			
Gross Costs	$ 808	$ 816	-1%
Less: Earned Revenue	119	119	0%
Net Costs	689	697	-1%
Exploration Systems			
Gross Costs	4,791	5,360	-11%
Less: Earned Revenue	68	62	10%
Net Costs	4,723	5,298	-11%
Science			
Gross Costs	7,030	6,697	5%
Less: Earned Revenue	1,019	649	57%
Net Costs	6,011	6,048	-1%
Space Operations			
Gross Costs	7,253	9,694	-25%
Less: Earned Revenue	58	429	-86%
Net Costs	7,195	9,265	-22%
Net Cost of Operations			
Gross Costs	19,882	22,567	-12%
Less: Earned Revenue	1,264	1,259	0%
Net Costs	**$ 18,618**	**$ 21,308**	-13%

A significant portion of the decrease in net costs relates to general costs for goods and services used in operations across NASA programs, with the majority for the ISS. Remaining costs are allocated to R&D/Other initiatives.

Aeronautics Research net cost decreased one percent in FY 2011. The Fundamental Aeronautics and Aviation Safety programs decreased. These costs were primarily offset by the Integrated Systems Research Program costs that increased. The Integrated Vehicle Health Management project was realigned with the Aviations Safety program to improve programmatic content.

Exploration Systems net cost decreased eleven percent from FY 2010 to FY 2011 primarily due to a decrease in costs related to the Constellation Systems Program. This decrease was somewhat offset by an increase in costing by the commercial crew and cargo development programs, which is consistent with the transition to the new human space flight directions, and the start-up phase of the new programs.

Science net cost decreased one percent in from FY 2010 to FY 2011. This change primarily reflects increased revenue in the Earth Science Geostationary Operational Environmental Satellite project and reimbursable authority for the Joint Polar Satellite System. These increases in net cost were partially offset by a decrease in the Polar Operational Environmental Satellite (POES) project.

Space Operations net cost decreased twenty-two percent from FY 2010 to FY 2011. This is primarily due to the completion of the operational phase of the Space Shuttle Program (SSP), the transition and retirement of the program elements, and the assembly of the U.S. portions of the International Space Station (ISS), consistent with the transition to the new human space flight directions.

Sources of Funding

NASA receives funds to support its operations primarily through Congressional appropriations. NASA's budgetary resources for FY 2011 totaled $21.3 billion, of which $615 million is the unobligated balance brought forward from FY 2010. NASA's source and use of budgetary authority is summarized in the table below.

NASA Budgetary Resources
(In Millions of Dollars)

Line Item	Audited 2011	Audited 2010	% Change
New Budget Authority	$ 18,449	$ 18,725	-1%
American Recovery and Reinvestment Act	—	4	-100%
Unobligated Balance Brought Forward	615	1,320	-53%
Other Resources	2,252	1,460	54%
Total Budgetary Resources	**$ 21,316**	**$ 21,509**	**-1%**
Total Obligations Incurred	20,639	20,894	-1%
Total Unobligated	**$ 677**	**$ 615**	**10%**

New Budget Authority which represents eighty-seven percent of NASA's total budgetary resources for FY 2011, was provided by Congress primarily through two-year appropriations. The Agency's funding appropriations decreased by $276 million, which included a rescission of $37 million.

Other Resources include realized reimbursable income for sharing NASA technology and providing services to other Federal agencies and public entities, and recoveries of budgetary resources that were obligated in a previous year. Other Resources increased by fifty-four percent in FY 2011 primarily for work performed for certain satellites, Geostationary Operations Environmental Satellite, and Polar Operations Environmental Satellite projects.

Obligations Incurred represents NASA's use of $20.6 billion of available budgetary resources to accomplish the Agency's goals within its four R&D/Other initiatives. Obligations Incurred decreased by one percent between FY 2011 and FY 2010. The reduction in obligations for appropriated funds was due to a decrease in the Agency's appropriations in FY 2011.

Balance Sheet

Assets

Total assets as of September 30, 2011 were $19.3 billion, an increase of $1 billion compared to September 30, 2010. The major categories of assets are detailed in the table below.

NASA Assets
(In Millions of Dollars)

Line Item	Audited 2011	Audited 2010	% Change
Property, Plant & Equipment	$ 9,840	$ 9,635	2%
Fund Balance with Treasury	9,395	8,601	9%
Other	107	92	16%
Total Assets	**$ 19,342**	**$ 18,328**	**6%**

NASA's largest category of assets is **Property, Plant and Equipment (PP&E)**, which increased two percent or $205 million in FY 2011. This increase is due to an increase in activity for certain satellites with the Air Force programs.

Fund Balance with Treasury (FBWT) represents NASA's cash balance at the Department of Treasury. FBWT increased by nine percent or $794 million.

Other includes investments of $17 million and Accounts Receivables of $90 million in FY 2011. Accounts Receivable increased by $19 million and primarily relating to billings due for certain satellites with the Air Force programs to replenish the aging fleet of communications spacecraft in the space network.

Liabilities

Total liabilities as of September 30, 2011 were $4.6 billion, an increase of $336 million compared to September 30, 2010. The major categories of liabilities are detailed in the table below.

NASA Liabilities
(In Millions of Dollars)

Line Item	Audited 2011	Audited 2010	% Change
Accounts Payable	$ 1,530	$ 1,462	5%
Other Liabilities	1,623	1,755	-8%
Environmental and Disposal Liabilities	1,445	1,041	39%
Federal Employee and Veteran's Benefits	51	55	-7%
Total Liabilities	**$ 4,649**	**$ 4,313**	**8%**

Accounts Payable, which represents amounts owed to other entities for goods and services received, increased by $68 million in FY 2011. This is due to an increase in liabilities for certain satellites and the Mars Science Lab projects.

Other Liabilities represents estimated contractor costs incurred but not yet paid, as well as contingent liabilities for litigation claims, accrued payroll and related costs; which decreased by $132 million. The reduction is due to lower estimated contractor costs for Space Shuttle Program activity in FY 2011 compared to FY 2010. The Space Shuttle was retired in FY 2011. Other liabilities relating to employee payroll were also lower due to less days of payroll accrual in FY 2011 compared to FY 2010.

Environmental and Disposal Liabilities are estimated cleanup costs for actual or anticipated contamination from waste disposal methods, leaks, spills, and other NASA activity that created, or could create, a public health or environmental risk, and cleanup costs associated with the removal, containment, and/or disposal of hazardous wastes or material and/or property. In FY 2011, NASA recorded an additional $404 million dollars of environmental and disposal liabilities to reflect the estimated total cost of environmental cleanup on known hazardous conditions bringing the total to $1,445 million, which includes anticipated cleanup at disposal for Space Shuttle and PP&E. The amount recorded in FY 2010 was $1,041 million. The majority of the increase is due to changes in individual project estimates and additional liabilities from disposal-related cleanup costs for PP&E.

Federal Employee and Veteran Benefits are amounts that the Department of Labor estimates on behalf of NASA for future worker's compensation liabilities for current employees. The estimate for future worker's compensation benefits includes the expected liability for death, disability, medical and miscellaneous costs for approved compensation cases, plus a component of claims incurred but not reported.

Net Position

Net Position is comprised of both Cumulative Re¬sults of Operations (CRO) and Unexpended Appropriations and increased by $678 million as compared to FY 2010.

NASA Net Position
(In Millions of Dollars)

Line Item	Audited 2011	Audited 2010	% Change
Unexpected Appropriations	$ 6,528	$ 5,706	14%
Cumulative Results of Operations	8,165	8,309	-2%
Total Net Position	**$ 14,693**	**$ 14,015**	**5%**

Unexpended Appropriations were higher by fourteen percent or $822 million in FY 2011 due to lower Appropriations Used primarily resulting from limited budget funding under the Continuing Resolution (CR), during FY 2011, which resulted in less disbursements and the delay of procurements.

Cumulative Results of Operations were lower by two percent or $144 million in FY 2011. During FY 2010 NASA adopted a change in accounting principle which reduced the FY 2011 beginning balance of the CRO by $2.0 billion. This decrease was offset by a change in the Net Cost of Operations and Total Financing Sources of $1.9 billion in FY 2011.

Fiscal Year 2011

Systems, Controls, and Legal Compliance

Management Assurances

Administrator's Statement of Assurance

November 15, 2011

NASA management is responsible for establishing and maintaining effective internal control and financial management systems that meet the objectives of the Federal Managers' Financial Integrity Act (FMFIA), as well as related laws and guidance. NASA is committed to a robust and comprehensive internal control program. We recognize that ensuring the effective, efficient, and responsible use of the resources that have been provided to the Agency is not only good stewardship, but also the right approach to maximizing our progress toward the realization of our goals. Within the Agency, I have made it clear that I am responsible for establishing and maintaining a sound system of internal control. In turn, I have made these responsibilities clear to my program management, mission support offices, and Center management—and they have communicated this responsibility to their subordinates. As a result, managers and employees throughout the Agency are active on a daily basis in identifying or updating key control objectives, assessing risks, implementing controls or other mitigating strategies, conducting reviews, and taking corrective actions as necessary.

NASA conducted its assessment of the effectiveness of internal control over operations and compliance with applicable laws and regulations in accordance with Office of Management and Budget (OMB) Circular A-123, Management's Responsibility for Internal Control. Based on the results of this evaluation, NASA can provide reasonable assurance that its internal controls over the effectiveness and efficiency of operations and compliance with applicable laws and regulations as of September 30, 2011, were operating effectively and no material weaknesses were found in the design or operation of the internal controls. NASA is also in conformance with Section 4 of FMFIA.

In addition, NASA's Office of the Chief Financial Officer (OCFO) performs an annual self-assessment review of the effectiveness of internal controls over financial reporting in compliance with OMB Circular A-123, Appendix A, "Internal Control Over Financial Reporting." During the current year, no material weaknesses were identified in the design and operation of internal controls over financial reporting. Accordingly, NASA makes an "unqualified statement of assurance" that its internal controls over financial reporting as of June 30, 2011, were operating effectively.

In accordance with the requirements of the Federal Financial Management Improvement Act (FFMIA), management is responsible for reporting on its implementation and maintenance of financial management systems that substantially comply with federal financial management systems requirements, applicable federal accounting standards, and the U.S. Government Standard General Ledger at the transaction level. I am pleased to report that NASA's financial management systems are in substantial compliance with the requirements of FFMIA as of September 30, 2011.

NASA will continue its commitment to ensuring a sound system of internal control exists over operations, financial reporting and compliance with laws and regulations.

Charles F. Bolden, Jr.
Administrator

Performance Improvement Plans

Performance Improvement Plans by Category

This section provides the explanations and performance improvement plans for any unmet performance measures in FY 2011 and, where applicable, their link to the previous year's performance.

When a NASA program does not meet its commitment as stated in the annual performance plan, responsible program officials must explain the performance shortfall and provide an improvement plan for correcting the issue. This year, in an effort to provide better performance improvement plans, NASA assessed the explanations and looked for trends in root causes, to inform senior management on any cross-cutting corrective actions that may be warranted. In addition, NASA used the information on management and performance challenges, as identified by the NASA's Office of Inspector General (OIG) and the Government Accountability Office (GAO), to help guide setting these improvement plans.

In FY 2011, NASA's OIG identified five areas that pose the top management and performance challenges to NASA leadership: the future of U.S. space flight, project management, infrastructure and facilities management, acquisition and contracting management, and information technology security and governance. GAO previously identified high risk factors along the same vein, including managing information technology, antiquated financial management systems, poor cost estimating, underestimated risks associated with development of major systems, and inadequate acquisition management in view of persistent cost growth and schedule slippage in the majority of projects. More information on OIG and GAO assessments of NASA can be found in the Management Challenges letter from NASA's OIG located in the full PAR and on the GAO High Risk Web site, respectively.

With the themes presented by OIG and GAO in mind, NASA categorized the measures and information on their shortfalls to provide context to the reader for why groups of measures may have been unmet. NASA has placed its performance shortfalls, and ensuing improvement plans into the following categories:

- Measures Requiring Improved Measurement Methods;
- Energy Use Management;
- Safety of Workforce and Assets;
- Taurus XL Launch Vehicle Failure;
- Commercial Space Flight Development;
- Human Spaceflight Program Transition;
- Scientific Research and Technology Development Process;
- Baseline Cost and Schedule Changes (includes sub-categories on acquisition management challenges, and program planning and controls); and
- Workforce, Workplace, and Diversity.

Looking forward, NASA will build upon the progress already made within some of these categories, such as corrective actions to mitigate cost growth and schedule slippage. Specifically, over the last five years, NASA fundamentally transformed how it manages its programs and projects, acquisition strategies, and procurements, including strengthening program and project management, establishing more rigorous cost estimation practices, and revising procurement practices and systems.

In subsequent years, NASA will track progress toward these plans and analyze the performance improvement trends in an effort to strengthen Agency performance.

Measures Requiring Improved Measurement Methods

NASA has an integrated system to plan strategy and implementation; monitor, assess, and evaluate performance toward commitments; identify issues; gauge programmatic and organizational health; and provide appropriate data and information to NASA decision-makers. NASA's planning and performance management processes provide data to Agency management through ongoing monthly and quarterly analyses and reviews; annual assessments in support of budget formulation (for budget guidance and issue identification, analysis, and disposition); annual reporting of performance, notification of management issues, and financial position; periodic, in-depth program or special purpose assessments; and recurring or special assessment reports to internal and external organizations. To ensure that these performance assessments provide the necessary information, NASA periodically revisits the effectiveness of its measures. Sometimes NASA identifies issues with the design of a measure, the method of data collection, or the practicality of a performance target, as well as some inaccuracies in metrics. This fiscal year, data collection methods for two measures did not yield enough information to accurately measure performance. NASA plans to improve on these data collection methods.

Fiscal Year 2011 Performance Improvement	**ST-11-15 (Performance Goal 3.4.1.3)**	
	Accountable Organization: Innovative Partnerships Program	
	Greater than 35 percent of the Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) Phase II technology projects awarded between 2004-2008 will be transferred into commercial products or services.	**FY 2011 Red**
	Why Measure ST-11-15 was Not Met: Based on NASA's current measurement method, NASA determined that it awarded 23.7% of SBIR/STTR projects (182 of 766) between 2004 and 2008 and had extended them past Phase II. NASA believes the numbers of commercialization successes are greater than the current methods indicate. To achieve commercialization, these projects used either NASA Phase III funds or an alternative source of non-NASA funding to develop the technology. Commercialization is a metric broadly defined by the SBA as a measure of the ability of SBIR/STTR contractors to successfully receive non-SBIR/STTR revenues for broad market, as well as other government applications, for technologies they developed under the SBIR/STTR programs. At NASA, this is defined as the sum of technology "infused" into NASA programs (metric 3.1.1.4), procured by other government agencies, and/or used in the commercial marketplace. The collection of non-NASA applications for this metric requires the voluntary sharing of information by SBIR/STTR contractors with NASA personnel. NASA continues to consider alternative methods of data collection that will lead to increasing accuracy in the measurement of commercialization successes.	
	FY 2011 Performance Improvement Plan: To acquire a greater amount of verifiable data, the SBIR/STTR program has instituted a survey as part of its 2011 SBIR/STTR solicitation requiring firms submitting proposals to share information with NASA on their success at commercializing technologies developed under previous SBIR/STTR awards. Data from this survey will be collected and analyzed in FY 2012. NASA plans to continue to use surveys in future SBIR/STTR solicitations so that NASA can compile a database of past commercializations, and when combined with infusion data on NASA programs (metric 3.1.1.4), provide a more accurate accounting of the commercialization data requested in metric 3.4.1.3.	
Fiscal Year 2011 Performance Improvement	**ED-11-7 (Performance Goal 6.2.1.1)**	
	Accountable Organization: Office of Education	
	5,000 educators use NASA resources in their curricula after participating in NASA professional development.	**FY 2011 Yellow**
	Why Measure ED-11-7 was Not Met: The ability to collect data from educators who have participated in NASA professional development is highly dependent upon those educators' response rates to follow-up surveys. Currently, NASA sends follow-up surveys to educators who have participated in an Agency-sponsored professional development program via e-mail, 120 days after the educator's experience. Tens of thousands of educators participate in NASA's programs, but only a small percent complete and submit the follow-up surveys. In FY 2011, less than 5,000 educators replied to the survey. NASA is generally able to establish and maintain ongoing relationships with higher education faculty because it is not difficult to obtain the necessary data on their use of NASA resources in their curricula. However, this proves to be extremely difficult with most K–12 and informal educators. Based on this, NASA continues to improve data collection methods.	
	FY 2011 Performance Improvement Plan: NASA plans to explore more effective means for collecting follow-up data from educators who participate in Agency-sponsored professional development. This includes potentially decreasing the 120-day follow-up period, making the submission of survey responses a prerequisite for gaining continued access to certain curricular tools, or possibly direct follow-up by phone or focus group. NASA will also consider creative ways to possibly incentivize educators to submit completed surveys. NASA Education is currently collaborating with OMB to identify ways to strengthen the Agency's surveying techniques and overall data collection methods.	

Energy Use Management

Since the mid-to-late 1980s, NASA has worked to reduce energy usage in its institutional buildings and mission installations. NASA made significant progress in meeting previous requirements (National Energy Conservation Policy Act, Federal Energy Management Improvement Act of 1988, and Energy Policy Act of 1992) to reduce energy intensity from an FY 1985 baseline. NASA implemented many of the high-yield investments that led to significant decreases in energy intensity, before statutory and executive order changes (Energy Policy Act of 2005 and Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management), adopted an FY 2003 baseline year for further energy intensity reduction. Additionally, Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance (2009), expanded upon the energy reduction and environmental performance requirements of E.O. 13423. The Agency will continue to improve our performance against targets for energy intensity, factoring all these requirements.

The performance measures below show the trend for energy intensity across a couple of years and NASA's plans for continuing to reduce it annually.

Fiscal Year 2010 Performance Improvement	**10FAC04**	
	Accountable Organization: Office of Strategic Infrastructure	
	Reduce energy intensity for facility energy use by 3% per year, from the FY 2003 baseline, for a total reduction of 30% (in Btu/gsf) by the end of FY 2015.	**FY 2010 Red**
	Why Measure 10FAC04 was Not Met: Energy intensity decreasing average of 1 percent annually and energy unit costs are increasing an average of 7.2 percent annually.	
	FY 2010 Performance Improvement Plan: NASA is working to meet energy intensity reduction requirements of 3 percent per year and 30 percent by 2015, from the FY 2003 baseline. In an effort to assist Centers to administer their energy management programs, NASA Headquarters conducts Energy and Water Management Functional Reviews at a third of NASA Centers annually to help Centers improve their management systems and identifying and implementing energy conservation measures. In FY 2010, NASA invested $66 million for construction and revitalization projects at four NASA Centers that include major replacements of aging high energy use equipment with new energy efficient units, and initiated an Inter-Center Competition to reduce energy/water consumption. The competition encourages Centers to implement low-cost and no-cost initiatives to reduce energy and water usage. NASA will allocate $4 million of Strategic Institutional Investment funds for small energy and renewable projects in FY 2011 and an additional $22.3 million in FY 2012. This past fiscal year, NASA also initiated a Recapitalization Program that will replace aging facilities with new more energy efficient buildings.	
	Plan Update: NASA's progress is outlined below in the explanation and performance improvement plan for this same measure, which was reported on in FY 2011, as well.	
Fiscal Year 2011 Performance Improvement	**Performance Goal 5.2.3.2**	
	Accountable Organization: Office of Strategic Infrastructure	
	HPPG: Conserve valuable natural resources by reducing NASA's energy and water use.	**FY 2011 Yellow**
	Why Performance Goal 5.2.3.2 was Not Met: Final performance data for this goal will be available in January 2012. Based on third quarter estimates and trending data, NASA expects to exceed its targets on the measures related to water use and fleet management, but fall short on the energy intensity goals. See rating explanation for ECR-11-1 for more detailed information on the energy intensity measure.	
	FY 2011 Performance Improvement Plan: Final performance data for this goal will be available in January 2012. Based on third quarter estimates and trending data, NASA reduced energy intensity by an estimated 1%, for an 8% reduction from 2003 baseline. The FY 2011 goal was 18% from the 2003 baseline and NASA expects to reduce energy intensity by 10% (+/- 2%) in that same timeframe. Recent NASA topline budget reductions lowered funding planned for specific energy efficiency measures and new building construction, restoration and rehabilitation, which negatively impacted NASA's energy conservation program and reduced chances of meeting federal requirements. Despite the reduced funding, NASA continues to work to reduce energy intensity, and during FY 2010/FY 2011, the Agency completed construction and received LEED certification for 12 new buildings (1 Certified, 2 Silver, 6 Gold, and 3 Platinum). Three completed buildings are under review for certification (2 Silver and 1 Gold), and ten more buildings are under construction seeking LEED certification of Silver or Gold level in FY 2012. Eleven buildings are in the design phase for Silver or Gold LEED level.	

Fiscal Year 2011 Performance Improvement	ECR-11-1 (Performance Goal 5.2.3.2)	
	Accountable Organization: Office of Strategic Infrastructure	
	Reduce energy intensity use annually by three percent from an FY 2003 baseline.	**FY 2011 Red**
	Why Measure ECR-11-1 was Not Met: Final performance data for this goal will be available in January 2012. Based on third quarter estimates and trending data, NASA reduced energy intensity by an estimated 1%, for an 8% reduction from 2003 baseline. The FY 2011 goal was 18% from the 2003 baseline and NASA expects to reduce energy intensity by 10% (+/- 2%) in that same timeframe. Recent NASA topline budget reductions lowered funding planned for specific energy efficiency measures and new building construction, restoration, and rehabilitation, negatively impacting NASA's energy conservation program and reducing chances of meeting Federal requirements. Despite the reduced funding, NASA continues to work to reduce energy intensity, and during FY 2010–FY 2011, the Agency completed construction and received LEED certification for 12 new buildings (1 Certified, 2 Silver, 6 Gold, and 3 Platinum). Three completed buildings are under review for certification (2 Silver and 1 Gold), and ten more buildings are under construction seeking LEED certification of Silver or Gold level in FY 2012. Eleven buildings are in the design phase for Silver or Gold LEED level.	
	FY 2011 Performance Improvement Plan: To continue efforts to reduce energy consumption and improve NASA's aging infrastructure, the Agency designs and constructs new buildings to minimum LEED Silver standard. NASA is evaluating co-generation such as Combined Heat and Power (CHP) project at four Centers that have district type utility distribution systems. These large projects will reduce energy consumption, use waste heat to generate energy, and provide energy security. NASA is increasing energy savings performance contract (ESPC)/utility energy service contract (UESC) projects at Centers and has created a position at Headquarters to support Centers with implementation and execution of these complex projects. The Agency has two UESC projects under way and has three additional UESCs under consideration. NASA is also executing four ESPCs at Centers and is reviewing two additional project opportunities. Additionally, NASA has performed an Agency survey for renewable energy project opportunities and is evaluating the final report for project identification. The Agency has applied for in-kind EUL authority with the FY 2012 budget request to implement large renewable energy projects.	

Safety of Workforce and Assets

NASA continues to have Safety as a core value. As stated in the 2011 NASA Strategic Plan, "NASA's constant attention to safety is the cornerstone upon which we build mission success. We are committed, individually and as a team, to protecting the safety and health of the public, our team members, and those assets that the Nation entrusts to the Agency." For years, NASA has maintained high goals for safety and statistically exceeds much of the federal government on aspects such as lost time due to work-related injuries and illnesses. These standards are maintained despite the risky nature of spaceflight and the unique challenges it poses. The Agency has taken a "holistic" approach to addressing all the aspects of safety for the public, NASA employees, contractors and partners, and assets. Measures are tracked internally with senior management on a monthly basis, and key indicators are reported externally, including in the annual performance report. New policies, procedures, and corrective actions are implemented as specific issues or undesirable trends are seen in the data.

The table below demonstrates several key indicators where NASA did not meet its targeted goals and how performance toward these will be improved.

Fiscal Year 2010 Performance Improvement	**Outcome AS.4**	
	Accountable Organization: Office of Safety and Mission Assurance	
	While promoting mission success, protect the public, NASA workforce, high-value equipment and property from potential harm as a result of NASA activities and operations by factoring safety, quality, risk, reliability, and maintainability as integral features of programs, projects, technologies, operations, and facilities.	**FY 2010 Yellow**
	Why Outcome AS.4 was Not Met: There were 12 permanent partial disability (Type B) mishaps that occurred to contract employees during FY 2010.	
	FY 2010 Performance Improvement Plan: Policy and procedures are currently in place to provide guidance and education to the NASA workforce (civil service and contractor employees) to minimize mishaps. Management is provided an out brief after each Type A or B mishap with the goal of disseminating information that will reduce the potential for future occurrences.	
	Plan Update: In FY 2010, there were no NASA Type A or NASA Type B injuries for the NASA civil servant workforce and zero injuries or fatalities for the public. For FY 2010, there were 14 contractor Type B mishaps (after final Office of Workers Compensation Programs review and approval). For FY 2011, there were 10 type B contractor injuries reported, (an improvement (reduction) of 29%) from FY 2010. There was also a reduction by 50% in the amount of falls. There were no NASA Type A or NASA Type B injuries for the NASA civil servant workforce and zero injuries or fatalities for the public. But based on the number of Type B mishaps seen for contractors, and to assure continued performance against the goal, NASA Injury statistics were reviewed for trends and awareness campaigns were developed as needed. Based on the unfavorable trend of fall mishaps, a fall protection campaign was developed at the NASA Safety Center along with fall prevention campaigns at the Centers.	
Fiscal Year 2010 Performance Improvement	**10SMS02**	
	Accountable Organization: Office of Safety and Mission Assurance	
	Assure no fatalities or permanent disabling injuries to the NASA workforce resulting from NASA activities during the fiscal year.	**FY 2010 Red**
	Why Measure 10SMS02 was Not Met: There were no fatalities or permanent, total disabilities (Type A) to the NASA workforce during the fiscal year. However, there were 12 permanent partial disability (Type B) mishaps that occurred to contract employees. This was an increase compared to the previous year. There were no Type A or B injuries to NASA civil service employees. NPR 8621.1 defines a Type A mishaps as a permanent total disability and Type B as an occupational injury and/or illness that has resulted in a permanent partial disability.	
	FY 2010 Performance Improvement Plan: Policy and procedures are currently in place to provide guidance and education to the NASA workforce (civil service and contractor employees) to minimize mishaps. Management is provided an out brief after each Type A or B mishap with the goal of disseminating information that will reduce the potential for future occurrences.	
	Plan Update: In FY 2011, there were zero fatalities and permanent disabiling injuries to the public and NASA civil servant workforce. Based on a review of trends of FY 2011 mishaps and close calls, NASA will be implementing an awareness campaign on Electrical Safety, and what Occupational Safety and Health Administration calls Control of Hazardous Energy, which includes Lockout/Tag out. NASA adjusted this measure in FY 2011 to incorporate reporting against the President's POWER initiative.	

Fiscal Year 2011 Performance Improvement	**AMO-11-10 (Performance Goal 5.2.1.2)**	
	Accountable Organization: Office of Safety and Mission Assurance	
	Reduce Total Case Rate and Lost Time Case Rate by one percent, in accordance with the President's Protecting Our Workers and Ensuring Reemployment (POWER) initiative.	**FY 2011 Red**
	Why Measure AMO-11-10 was Not Met: At year-end, NASA was about 2 times lower (better) than the President's Protecting our Workers & Ensuring Reemployment (POWER) goal for TCR and 5 times lower (better) than the POWER goal for LTCR. However, NASA undertook a stretch goal of lowering the Agency's already low rates by 1%, from the POWER baseline goal year (FY 2009). The data for this calculation is current through the third quarter (fourth quarter data is not available until December), with end-of-year projections by the Department of Labor's Office of Workers' Compensation Programs, who must validate and accept these cases, that place NASA at small upswings in both TCR and LTCR from the FY 2009 base year (thus missing the 1% internal goal). Even with the slight upswings, NASA still remains one of the best in the government, and still significantly below (better than) the POWER goals.	
	FY 2011 Performance Improvement Plan: Since NASA's rate already exceeded (better than) the Presidents POWER initiative and is one of the lowest in the government, NASA did not take any global initiatives to reduce this already excellent rate. However, spot initiatives were developed field center by field center to address specific trends in lost time and close call incidents.	
Fiscal Year 2011 Performance Improvement	**Performance Goal 5.2.1.3**	
	Accountable Organization: Office of Safety and Mission Assurance	
	By 2015, reduce damage to NASA assets by eight percent from the 2010 baseline.	**FY 2011 Red**
	Why Performance Goal 5.2.1.3 was Not Met: NASA does not anticipate meeting this performance goal by 2015, due to the Glory launch vehicle mishap, in fiscal year 2011. This goal is based on the average across five years of all realized costs of the damage to NASA's assets. Based on the magnitude of the cost of the loss of the Glory mission, the five year average will show a growth, rather than a reduction by 2015, irrespective of no damage beyond FY 2011. However, with mission failure costs taken out and accounted for separately, NASA is projected to meet the institutional property and facility loss goals, that also feed this performance goal.	
	FY 2011 Performance Improvement Plan: NASA created the Glory Satellite Mishap Investigation Board to evaluate the cause of the failure. The board began its investigation in March 2011. Members will gather information, analyze the facts, identify the failure's cause or causes and identify contributing factors. The board will make recommendations to the NASA administrator to prevent similar incidents. The endorsed mishap report findings and recommendations will be reviewed by NASA senior management for both programmatic and for institutional failures, and corrective action will be taken as needed.	
Fiscal Year 2011 Performance Improvement	**AMO-11-11 (Performance Goal 5.2.1.3)**	
	Accountable Organization: Office of Safety and Mission Assurance	
	Reduce damage to NASA assets by two percent per fiscal year, based on a five-year running average.	**FY 2011 Red**
	Why Measure AMO-11-11 was Not Met: NASA does not anticipate meeting this performance goal by 2015 due to the Glory launch vehicle mishap in fiscal year 2011. This goal is based on the average across five years of all realized costs of the damage to NASA's assets. Based on the magnitude of the cost of the loss of the Glory mission, the five year average will show a growth, rather than a reduction by 2015, even if there is no damage to any other NASA assets beyond FY 2011. However, with mission failure costs taken out and accounted for separately, NASA is projected to meet the institutional property and facility loss goals that also feed this performance goal.	
	FY 2011 Performance Improvement Plan: NASA created the Glory Satellite Mishap Investigation Board to evaluate the cause of the failure. The board began its investigation in March 2011. Members will gather information, analyze the facts, identify the failure's cause or causes and identify contributing factors. The board will make recommendations to the NASA administrator to prevent similar incidents. The endorsed mishap report findings and recommendations will be reviewed by NASA senior management for both programmatic and for institutional failures, and corrective action will be taken as needed.	

Additional Context

Performance Goal 5.2.1.2: *By 2015, achieve a four percent reduction in the total case rate and lost time rate for the NASA civil service work force* is rated Green. NASA expects to remain on track for this performance goal under the current extrapolated projection, based on past trends.

Taurus XL Launch Vehicle Failure

The Glory Earth-observing satellite was intended to improve our understanding of how the Sun and tiny atmospheric particles called aerosols affect Earth's climate. On March 4, 2011, Glory launched from Vandenberg Air Force Base in California. The countdown and launch went smoothly until the point at which the fairing should have separated from the vehicle. Telemetry indicated that the launch vehicle failed because the fairing, the protective shell atop the rocket, did not separate as expected about three minutes after launch, and as a result the launch vehicle did not deliver the Glory spacecraft to orbit. NASA has created a Mishap Investigation Board to evaluate the cause of the failure.

NASA's previous launch attempt of an Earth science spacecraft, the Orbiting Carbon Observatory onboard a Taurus XL on February 24, 2009, also failed to reach orbit when the fairing did not separate. NASA's Orbiting Carbon Observatory Mishap Investigation Board reviewed the launch data and the fairing separation system design and developed a corrective action plan. The plan was implemented by Taurus XL manufacturer Orbital Sciences Corporation. In October 2010, NASA's Flight Planning Board confirmed the successful closure of the corrective actions.

This second launch failure had far reaching impacts on NASA's reported performance. Multiple measures demonstrate the impact of the Glory launch mishap, which is reflective of how NASA works in an integrated manner, across multiple organizations, to ensure mission success. Since 1998, NASA has averaged a 97 percent mission success rate for all missions using expendable launch vehicles. The Office of Safety and Mission Assurance supports this success rate through the development, implementation, and oversight of Agency-wide safety, reliability, maintainability, and quality assurance policies and procedures. The Human Exploration and Operations Mission Directorate's Launch Services Program (LSP) works closely with other U.S. government agencies and the launch industry to ensure that the most safe, reliable, on-time, cost-effective commercial launch opportunities are available on a wide range of launch systems. The Science Mission Directorate develops and manages these missions and works with LSP to match their requirements with the appropriate reliable and available launch vehicle.

NASA will consider the results of the investigation when determining the next steps for providing reliable mid-sized launch services for NASA science missions. The lessons from addressing this mishap will respond to how all of these organizations continue to work together to ensure future mission success, which is reflected in the performance improvement plans outlined below.

Mission Assurance and Launch Rate Success		
Fiscal Year 2011 Performance Improvement	**Performance Goal 5.2.1.3**	
	Accountable Organization: Office of Safety and Mission Assurance	
	By 2015, reduce damage to NASA assets by eight percent from the 2010 baseline.	**FY 2011 Red**
	Why Performance Goal 5.2.1.3 was Not Met: NASA does not anticipate meeting this performance goal by 2015, due to the Glory launch vehicle mishap in fiscal year 2011. This goal is based on the average across five years of all realized costs of the damage to NASA's assets. Based on the magnitude of the cost of the loss of the Glory mission, the five year average will show a growth, rather than a reduction by 2015, even if there is no damage to any other NASA assets beyond FY 2011. However, with mission failure costs taken out and accounted for separately, NASA is projected to meet the institutional property and facility loss goals that also feed this performance goal.	
	FY 2011 Performance Improvement Plan: NASA created the Glory Satellite Mishap Investigation Board to evaluate the cause of the failure. The board began its investigation in March 2011. Members will gather information, analyze the facts, identify the failure's cause or causes and identify contributing factors. The board will make recommendations to the NASA administrator to prevent similar incidents. The endorsed mishap report findings and recommendations will be reviewed by NASA senior management for both programmatic and for institutional failures, and corrective action will be taken as needed.	

Fiscal Year 2011 Performance Improvement	AMO-11-11 (Performance Goal 5.2.1.3) Accountable Organization: Office of Safety and Mission Assurance	
	Reduce damage to NASA assets by two percent per fiscal year, based on a five-year running average.	FY 2011 Red
	Why Measure AMO-11-11 was Not Met: This annual performance goal will not be met in FY 2011, due to the failure of the Taurus XL launch vehicle which resulted in the loss of the Glory mission. Based on the magnitude of the cost of the loss of the Glory mission, FY 2011 will see a growth from FY 2010, rather than a reduction.	
	FY 2011 Performance Improvement Plan: NASA created the Glory Satellite Mishap Investigation Board to evaluate the cause of the failure. The board began its investigation in March 2011. Members will gather information, analyze the facts, identify the failure's cause or causes and identify contributing factors. The board will make recommendations to the NASA administrator to prevent similar incidents. The endorsed mishap report findings and recommendations will be reviewed by NASA senior management for both programmatic and for institutional failures, and corrective actions will be taken as needed.	

Fiscal Year 2011 Performance Improvement	SFS-11-2 (Performance Goal 5.4.1.1) Accountable Organization: Human Exploration and Operations Mission Directorate, Launch Services Program	
	Sustain 100 percent success rate with the successful launch of NASA-managed expendable launches as identified on the Launch Services Flight Planning Board manifest.	FY 2011 Yellow
	Why Measure SFS-11-2 was Not Met: This annual performance goal was not met due to the loss of the Glory mission. NASA's Glory satellite did not reach orbit after its liftoff on March 4, 2011, due to a launch vehicle mishap. The Launch Services Program successfully launched the other three missions scheduled for this fiscal year. Aquarius successfully launched aboard a Delta II launch vehicle on June 10, 2011 from Vandenberg Air Force Base, CA. The Juno mission launched aboard an Atlas V rocket on August 5, 2011, from Cape Canaveral Air Force Station, FL. And lastly, the GRAIL mission launched aboard a Delta II Heavy launch vehicle on September 10, 2011.	
	FY 2011 Performance Improvement Plan: NASA created the Glory Satellite Mishap Investigation Board to evaluate the cause of the failure. The board began its investigation in March 2011. Members will gather information, analyze the facts, identify the failure's cause or causes and identify contributing factors. The board will make recommendations to the NASA administrator to prevent similar incidents. The endorsed mishap report findings and recommendations will be reviewed by NASA senior management for both programmatic and for institutional failures, and corrective actions will be taken as needed.	

Additional Context

Performance Goal 5.4.1.1: *Complete Launch Services Program (LSP) objectives for all NASA-managed expendable launches* is rated Green. On average NASA, achieves its success rate for expendable launches, and expects to remain on track for future planned ones.

Performance Measure ES-11-12: *Complete the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) Mission Readiness Review* is rated Green. This annual performance goal was met. The NPP Mission Readiness Review was completed on September 6, 2011.

Science Mission Objectives (Including Those Beyond Glory)		
Fiscal Year 2011 Performance Improvement	**Performance Goal 2.1.5.2**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	HPPG: In support of studying Earth from space, NASA will make significant progress towards completion of the integration, test, launch, validation, and initiation of early on-orbit operations of the Glory and NPOESS Preparatory Project (NPP) missions prior to the end of fiscal year 2011.	**FY 2011 Red**
	Why Performance Goal 2.1.5.2 was Not Met: This high priority performance goal was not met, due to the loss of the Glory mission when the fairing from the Taurus XL launch vehicle failed to separate from the rocket. The National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) mission was successfully launched on October 28, 2011.	
	FY 2011 Performance Improvement Plan: NASA continues to take actions to mitigate any impacts from the Glory launch mishap. The Science Mission Directorate (SMD) is evaluating the loss of the mission on the long-term science objectives and discussing the options available to keep on-track toward this performance goal. The relative priority for replacing the Glory measurements will be considered in the context of the Earth Science portfolio and all of its objectives.	
Fiscal Year 2011 Performance Improvement	**ES-11-13 (Performance Goal 2.1.5.2)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete the Glory Launch Readiness Review.	**FY 2011 Red**
	Why Measure ES-11-13 was Not Met: The Glory Launch Readiness Review was completed on February 21, 2011, with a second review completed on March 2, 2011. The spacecraft and instruments were checked out and prepared to successfully begin their mission. However, the Glory mission, which was launched from Vandenberg Air Force Base on March 4, 2011, did not reach orbit, due to a mishap with the launch vehicle. Initial evidence suggests that the fairing, which protects the spacecraft during takeoff atop the Taurus XL launch vehicle, did not separate as required, when it reached the appropriate altitude.	
	FY 2011 Performance Improvement Plan: See the FY 2011 Performance Improvement Plan for Performance Goal 2.1.5.2 above.	

Commercial Space Flight Development

Throughout FY 2010, NASA's Commercial Orbital Transportation Services (COTS) partners, SpaceX and Orbital, continued to make progress toward developing systems to provide cargo resupply services to the International Space Station. Commercial development is a new way of doing business for NASA, and the partners continue to learn and make progress. As the partners have transitioned from development to integration and testing, they have encountered technical challenges similar to the development of any major space system. Subsequently, the resolution of these challenges has caused delays to the partners' demonstration flights into FY 2011.

In December 2010, SpaceX launched its first demonstration of its COTS transportation capabilities. Both SpaceX and Orbital are expected to demonstrate proximity operations and berthing to the International Space Station (ISS) in FY 2012 to complete the COTS milestones and prove maturity of the systems for ISS commercial resupply services. In FY 2011, NASA augmented funding of the COTS Space Act Agreements to add additional milestones for risk-mitigation, including a first-flight of Orbital's Taurus II launch vehicle in December 2011. NASA continues to work actively with its partners to ensure success of the COTS development through completion of demonstration flights and start of commercial resupply services to ISS in FY 2012.

The performance measures below demonstrate the technical challenges that are seen on the development of any major space system and how both NASA and its partners will continue to address these, to head toward success.

Fiscal Year 2010 Performance Improvement	**Outcome 5.2**	
	Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
	By 2010, demonstrate one or more commercial space capabilities for ISS cargo and/or crew transport.	**FY 2010 Yellow**
	Why Outcome 5.2 was Not Met: Both partners, Space Exploration Technologies Corporation (SpaceX) and Orbital Sciences Corporation (Orbital), are making progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts.	
	FY 2010 Performance Improvement Plan: SpaceX is planning for its first ISS demonstration flight in late fall 2010, with remaining flights scheduled for later in FY 2011. Orbital currently is planning its demonstration flight for fall 2011.	
	Plan Update: NASA Commercial Orbital Transportation Services (COTS) partner SpaceX successfully completed their Demonstration 1 mission on December 8, 2010.	
Fiscal Year 2010 Performance Improvement	**10CS07**	
	Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
	In FY 2010, have at least one partner demonstrate flight proximity operations with ISS.	**FY 2010 Yellow**
	Why Measure 10CS07 was Not Met: Both partners, SpaceX and Orbital, made progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts and are continuing toward demonstrating flight operations with ISS in FY 2011.	
	FY 2010 Performance Improvement Plan: The second SpaceX flight, in June 2011, will demonstrate flight proximity operations with ISS. Orbital currently anticipates scheduling its demonstration flight for FY 2012.	
	Plan Update: APG 10CS07 was not completed in FY 2011 due to development challenges. Partner experienced delays as their program transitioned from design to integration and test; however, they continue to make technical progress toward their development and demonstration milestones. These challenges continue to be resolved, and NASA continues to work with our partners.	

Fiscal Year 2010 Performance Improvement	**10CS08**	
	Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
	By the end of FY 2010, conduct one or more demonstration flights to, and berth with, the ISS.	**FY 2010 Yellow**
	Why Measure 10CS08 was Not Met: Both partners, SpaceX and Orbital, made progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts and are continuing toward demonstration flights to, and berthing with, ISS in FY 2011.	
	FY 2010 Performance Improvement Plan: SpaceX is planning for its third demonstration flight to, and berth with, ISS in late FY 2011. Orbital currently anticipates scheduling its demonstration flight for FY 2012.	
	Plan Update: APG 10CS08 was not accomplished due to development challenges. Partner experienced delays as their program transitioned from design to integration and test, they both continue to make technical progress toward their development and demonstration milestones. These challenges continue to be resolved, and NASA continues to work with our partners.	
Fiscal Year 2011 Performance Improvement	**CS-11-2 (Performance Goal 1.2.1.1)**	
	Accountable Organization: Human Exploration and Operations, Commercial Spaceflight	
	Conduct a minimum of one commercial cargo demonstration flight of proximity operations with ISS.	**FY 2011 Yellow**
	Why Measure CS-11-2 was Not Met: This annual performance goal was not met in FY 2011 and is planned to occur in FY 2012. This performance target was not accomplished due to development challenges by NASA's partners. These partners experienced delays as their programs transitioned from design to integration and test, and they both continue to make technical progress toward their development and demonstration milestones.	
	FY 2011 Performance Improvement Plan: SpaceX and Orbital continue to make progress, mitigating risk and solving technical challenges, and plan a demonstration of proximity operations with ISS in FY 2012. During FY 2011, NASA negotiated additional risk mitigation milestones with each partner. The additional milestones help to improve mission success by (1) augmenting ground and flight testing; (2) accelerating development of enhanced cargo capabilities; or (3) further developing ground infrastructure needed for commercial cargo capabilities.	
Fiscal Year 2011 Performance Improvement	**CS-11-3 (Performance Goal 1.2.1.1)**	
	Accountable Organization: Human Exploration and Operations, Commercial Spaceflight	
	Conduct a minimum of one safe berthing of commercial cargo transportation systems with the ISS.	**FY 2011 Yellow**
	Why Measure CS-11-3 was Not Met: This annual performance goal was not met in FY 2011 and is planned to occur in FY 2012. This performance target was not accomplished due to development challenges by NASA's partners. These partners experienced delays as their programs transitioned from design to integration and test, and they both continue to make technical progress toward their development and demonstration milestones.	
	FY 2011 Performance Improvement Plan: SpaceX and Orbital continue to make progress and plan to conduct a minimum of one safe berthing of commercial cargo transportation systems with the ISS in FY 2012. During FY 2011, NASA negotiated additional risk mitigation milestones with each partner to help improve mission success.	

Additional Context

Performance Measure CS-11-1: *Conduct a minimum of one commercial cargo demonstration flight of new cargo transportation systems* is rated Green. NASA's Commercial Orbital Transportation Services (COTS) partner SpaceX successfully completed its Demonstration 1 mission on December 8, 2010. Further details can be seen at http://www.nasa.gov/home/hqnews/2010/dec/HQ_10-327_SpaceX_Launch.html.

Human Spaceflight Program Transition

On July 8, 2011, NASA launched the Space Shuttle *Atlantis* (STS-135) as the last mission of the Space Shuttle Program. With the addition of STS-135 to the Space Shuttle launch manifest, the program was extended six months past the target date of retiring the Shuttle by the end of 2010. The delay of the original retirement date caused downrange effects on the transition of hardware, assets, and workforce to new human spaceflight programs.

With the landing of *Atlantis*, NASA was able to begin transition and closeout of the Space Shuttle Program and proceed with the new direction of the Nation's new beyond low-Earth orbit exploration program. In FY 2011, NASA began developing plans for implementing the Space Launch System (SLS) and Multi-Purpose Crew Vehicle (MPCV) projects, including transition of relevant design and developmental activities of the Constellation Program. In September 2011, NASA announced the selection of the new SLS and MPCV designs and is moving forward with transition of applicable work from the Ares and Orion projects toward a first light of the 70-ton SLS vehicle in 2017.

The performance ratings in the table below demonstrate the combined delay of the Space Shuttle Program and the transition to the new programs, with their requisite start-up activities. NASA will strive to meet the goals set forth for MPCV and SLS in the coming years.

ISS Assembly & Space Shuttle Retirement		
Fiscal Year 2010 Performance Improvement	**Outcome 1.2**	
	Accountable Organization: Space Operations Mission Directorate, Space Shuttle Program	
	By December 31, 2010, retire the Space Shuttle.	**FY 2010 Yellow**
	Why Outcome 1.2 was Not Met: The rating for 1.2 reflects an adjusted mission schedule that postpones Shuttle retirement activities in response to an Administration policy decision to extend Shuttle flights beyond 2010 to support the completion of the International Space Station.	
	FY 2010 Performance Improvement Plan: Based on the extended mission schedule, NASA plans to retire the Space Shuttle in 2011.	
	Plan Update: NASA completed the Space Shuttle manifest with the launch and landing of STS-135 in July 2011. NASA is executing the plans to display the four remaining orbiters—three operational orbiters and the program's test vehicle—at institutions across the country to inspire the next generation of explorers and engineers.	
Fiscal Year 2010 Performance Improvement	**10ISS03**	
	Accountable Organization: Space Operations Mission Directorate, International Space Station Program	
	Per the final configuration agreed to by the International Partners, fly the ISS elements and logistics baselined for FY 2010.	**FY 2010 Yellow**
	Why Measure 10ISS03 was Not Met: Due to technical difficulties and unforeseen delays, NASA was unable to fly all ISS elements and logistics planned for FY 2010.	
	FY 2011 Performance Improvement Plan: Consistent with an Administration policy decision, NASA has revised the Shuttle manifest and related logistics to accommodate the delays experienced in FY 2010 and anticipates ISS completion in FY 2011.	
	Plan Update: The Space Shuttle delivered the final elements of the ISS configuration in FY 2011.	

Transitioning Shuttle Assets and Workforce to New Programs		
Fiscal Year 2010 Performance Improvement	**10SSP03**	
	Accountable Organization: Space Operations Mission Directorate, Space Shuttle Program	
	Complete close-out and transfer plans for all remaining Space Shuttle flight hardware elements and other major Space Shuttle property assets, including the disposition plans for the Orbiters and the means by which significant gaps in human spaceflight operations capabilities will be managed if needed to support future activities.	**FY 2010 Yellow**
	Why Measure 10SSP03 was Not Met: The Agency's decision to extend Space Shuttle flights into 2011 and the uncertainty regarding the future of the Constellation Program caused a delay in finalizing Shuttle asset disposition plans and resolving the human space flight gap.	
	FY 2010 Performance Improvement Plan: Disposition plans for the orbiters will be completed once NASA announces final display locations. NASA plans to resolve funding gaps for human spaceflight capabilities through the FY 2012 budget development process.	
	Plan Update: In April 2011, NASA announced plans to display the four remaining orbiters—three operational orbiters and the program's test vehicle—at institutions across the country to inspire the next generation of explorers and engineers. During FY 2011, NASA focused on finalizing plans to transfer Orbiters to their final display locations. Additionally, NASA released major Space Shuttle operations facilities at the Kennedy Space Center (including the Vehicle Assembly Building and Launch Complex 39-A) for future institutional and programmatic use.	
Fiscal Year 2010 Performance Improvement	**10SSP05**	
	Accountable Organization: Space Operations Mission Directorate, Space Shuttle Program	
	With the Constellation Program, complete and deliver one workforce transition strategy report update to Congress in FY 2010.	**FY 2010 Yellow**
	Why Measure 10SSP05 was Not Met: Development of Workforce Transition Strategy reports has been rescheduled pending direction to the Agency following the release of the FY 2011 President's Budget Submit, the proposed transition of the Constellation Program, and identification of future work. In the FY 2011 budget process, the President proposed to Congress that the Constellation Program be transitioned and NASA adjusted its spending on the program consistent with its budget request and with the Appropriation provided by Congress for FY 2010.	
	FY 2010 Performance Improvement Plan: The plan is pending decision of the proposed transition of the Constellation Program.	
	Plan Update: In FY 2010, the Constellation Program was redirected to reflect new Presidential and Congressional direction in NASA's space exploration goals. The new direction called for the start up of the Multi-Purpose Crew Vehicle and Space Launch Systems Programs. Factoring these new programs, and with completion of the Space Shuttle program in July 2011, NASA delivered the Workforce Strategy Report to Congress in September 2011.	
Fiscal Year 2011 Performance Improvement	**AMO-11-1 (Performance Goal 5.1.1.1)**	
	Accountable Organization: Mission Support Directorate, Office of Human Capital Management	
	Seventy-five percent or more of Shuttle workforce has been realigned for new Agency needs.	**FY 2011 Yellow**
	Why Measure AMO-11-1 was Not Met: NASA did not meet the target for this annual performance goal as a result of Congressional budget action. The addition of a Shuttle mission and delays in the mission manifest resulted in a slower than planned transition of workforce from the Space Shuttle Program. Additionally, the year-long Continuing Resolution significantly delayed the start of new programs to which NASA planned to transition the Space Shuttle workforce.	
	FY 2011 Performance Improvement Plan: Upon landing of the Space Shuttle *Atlantis* on STS-135 to complete the shuttle program in July 2011, the NASA civil service workforce is being realigned with other Agency priorities. NASA plans to complete this activity in FY 2012.	

Formulation of New Human Space Exploration Programs		
Fiscal Year 2010 Performance Improvement	**10SFS09**	
	Accountable Organization: Space Operations Mission Directorate, Rocket Propulsion Test Program	
	Identify agency rocket propulsion test core capabilities (both infrastructure and critical skills) and maintain them at appropriate levels to be able to meet NASA's current and future rocket testing requirements, and deliver an integrated Agency-level Rocket Propulsion Test Plan that spans the next 10 years and includes DoD and commercial partner requirements and capabilities, as appropriate.	**FY 2010 Yellow**
	Why Measure 10SFS09 was Not Met: The Agency-level Rocket Propulsion Test Plan due date was re-negotiated and agreed upon between NASA and the Office of Management and Budget. The new due date is December 31, 2010.	
	FY 2010 Performance Improvement Plan: The Rocket Propulsion Test Plan is on schedule to meet the December 31, 2010, deadline.	
	Plan Update: The draft Rocket Propulsion Test (RPT) Master Plan was delivered to Headquarters in February 2011. The RPT Master Plan was initially drafted with Constellation Program requirements and had to be revised for the new programs. Due to a delay in identification and incorporation of firm test requirements for the follow-on Space Launch System (SLS), final approval of the Master Plan was not finalized until July 2011. The Rocket Propulsion Test Plan was delivered to Headquarters and signed by the Associate Administrator of the Space Operations Mission Directorate on July 11, 2011.	
Fiscal Year 2011 Performance Improvement	**SFS-11-4 (Performance Goal 5.4.2.1)**	
	Accountable Organization: Human Exploration Operations Mission Directorate, 21st Century Ground Systems Program	
	Develop a 21st Century Space Launch Complex (21st CSLC) plan.	**FY 2010 Yellow**
	Why Measure SFS-11-4 was Not Met: This annual performance goal was not met due to a revision on the originally planned schedule for this activity. As is typical with NASA programs and projects in the formulation phase, schedules are expected to change as they are refined heading toward the development phase. As the fiscal year progressed, the maturity of the Human Exploration Capabilities programs increased, and NASA began to work through the significant milestones and associated product development and has settled on the current schedule. Under this schedule, NASA expects that this activity will be completed in the first quarter of FY 2012.	
	FY 2011 Performance Improvement Plan: The 21st Century Ground Systems Program (21CGS) was formally stood up in FY 2011 in accordance with NASA's authorization from Congress, and continues to make progress toward developing its plans to support Exploration Systems Development. Although the 21CGS plan is not officially required until the completion of the Systems Design Review, the draft plan is in the review cycle, with an expected approval in FY 2012.	

Additional Context

Performance Goal 1.1.1.2: *HPPG: Safely fly out the Space Shuttle manifest and retire the fleet* is rated Green. This goal achieved all of its FY 2011 targets.

Performance Measure SSP-11-1: *Release major Space Shuttle operations facilities at Kennedy Space Center for future institutional and programmatic use.* This goal has been met.

Performance Goal 5.3.1.1: *Develop and execute the Rocket Propulsion Test (RPT) Master Plan* is rated Green.

Performance Measure SFS-11-1: *Release the Rocket Propulsion Test (RPT) Master Plan* is rated Green. This annual performance goal was met. The Rocket Propulsion Testing Master Plan was signed in July 2011. The plan will be reviewed annually and adjusted according to any evolving requirements and funding availability.

Performance Goal 1.3.1.1: *Complete design reviews for Space Launch System (SLS)* is rated Green. New human space flight programs were initiated in fiscal year 2011.

Performance Measure HEC-11-1: *Develop top level Agency requirements and draft Program Plan for Space Launch System (SLS)* is rated Green.

Performance Goal 1.3.1.2: *Complete design reviews for Multi-Purpose Crew Vehicle (MPCV)* is rated Green.

Performance Measure HEC-11-2: *Develop top level Agency requirements and Program Plan for Multi-Purpose Crew Vehicle (MPCV)* is rated Green.

Performance Goal 5.4.2.1: *By FY 2014, enable future government and commercial launching and testing from the Florida launch and range complex* is rated Green. Despite delays due to the year long continuing resolution, the top-level requirements were defined and baselined in the Human Exploration Capabilities Requirements Document during 2011, and a draft program plan is in review.

Scientific Research and Technology Development Process

Scientific research and technology development is an ongoing and fluid business. Often goals are not met because of the dynamic nature of research and technology, which could be impacted by new discoveries, refinement to plans based on new knowledge, new partnerships, a change in priorities, or an optimistic estimate of the pace of future progress into the unknown. The process of creating science or technology generally starts with setting science or research objectives and then finding the "best" performer to contribute toward reaching these objectives, through awarded intramural or extramural efforts. Once awarded, science or research activities begin, and then culminate with a transfer of knowledge or technology placed into an application. Multiple factors can slow the award process, delivery of the scientific or research product, and/or the transition of scientific knowledge or technology for application. For example, delays in the selection process may be caused by delayed availability of funds or a refinement to the solicitation for new ideas, based on a decision to factor new cutting-edge knowledge into the objectives. Additionally, delivery of scientific or research products on original timeframes can be impacted by the availability of a research platform or the discovery that attaining the objectives is unexpectedly complex. NASA's science and research products often depend on vehicle availability for space flight or complex ground-based laboratories, such as a wind tunnel, or the availability of appropriately skilled researchers. Transition of science or technology into an application, can also be impacted by factors in these processes, as well.

NASA's performance measures demonstrated in the table below reflect these various factors and their impact on the planned scientific research and technology development and how the Agency will attempt to mitigate these factors in the coming fiscal year.

Times to Award Can Be Impacted by Various Factors		
Fiscal Year 2010 Performance Improvement	**Outcome 3E.5**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	For vehicle and propulsion technologies that simultaneously reduce fuel burn, noise, and emissions, by 2016 develop a well-informed trade space, document performance potential, and identify technical risks to a level that enables incorporation of technologies into the design of new aircraft.	**FY 2010 Yellow**
	Why Outcome 3E.5 was Not Met: In addition conducting research through test flights of a hybrid wing body aircraft configuration, NASA sought out additional advanced vehicle concepts from its stakeholders through a solicitation. NASA significantly re-scoped the effort for the NASA Research Announcement (NRA) mid-year, changing the requirements from an advanced vehicle concept study NRA to an advanced vehicle concept study that will develop two concepts to the Preliminary Design Review (PDR) stage.	
	FY 2010 Performance Improvement Plan: NASA is currently negotiating these contracts and expects to announce awards in the first quarter of FY 2011.	
	Plan Update: Three awards were made in the first quarter of FY 2011. Two awards in November 2010, and one in December 2010. This Outcome is (was) back on track to achieve 2016 goals. Note that this Outcome has been revised in both the 2011 Strategic Plan and the FY 2011 Performance Plan.	
Fiscal Year 2010 Performance Improvement	**10AT12**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	In FY 2010, award a contract to conduct N+2 vehicle systems studies.	**FY 2010 Yellow**
	Why Measure 10AT12 was Not Met: NASA significantly rescoped the effort for the NRA mid-year, changing the requirements from an advanced vehicle concept study NRA to an advanced vehicle concept study that will mature two concepts to PDR stage.	
	FY 2010 Performance Improvement Plan: NASA is currently negotiating these contracts and expects to announce awards in the first quarter of FY 2011.	
	Plan Update: Three awards were made in the first quarter of FY 2011. Two awards in November 2010 and one in December 2010. This work has been accomplished.	

Fiscal Year 2010 Performance Improvement	**10ES20**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Reduce time within which 80% of NRA research grants are awarded, from proposal due date to selection, by 5% per year, with a goal of 227 days.	**FY 2010 Yellow**
	Why Measure 10ES20 was Not Met: The time within which 80 percent of the Earth Science selection notifications were made decreased in FY 2010 to 231 days, but fell just short of the ultimate goal of 227 days, which it was scheduled to achieve this fiscal year.	
	FY 2010 Performance Improvement Plan: The Science Mission Directorate continues to implement changes to reduce delayed selection notifications. These include the scheduling of proposal due dates to spread out the work for the understaffed research program managers and providing tentative notification to proposers when budget uncertainty (e.g., lack of appropriations, lack of operating plan) delays final decision authority.	
	Plan Update: With the impact of the FY 2011 Continuing Resolution (CR) taken into account, Earth Science showed improvement during FY 2011 by decreasing the time for selection notifications from 231 days to less than 200. (value removes the estimated impact of the extended CR).	
Fiscal Year 2010 Performance Improvement	**10HE12**	
	Accountable Organization: Science Mission Directorate, Heliophysics Division	
	Reduce time within which 80% of NRA research grants are awarded, from proposal due date to selection, by 5% per year, with a goal of 130 days.	**FY 2010 Red**
	Why Measure 10HE12 was Not Met: The time within which 80 percent of Heliophysics selection notifications were made increased in FY 2010 to 235 days, exceeding the goal of 215 days.	
	FY 2010 Performance Improvement Plan: The Science Mission Directorate continues to implement changes to reduce delayed selection notifications. These include the scheduling of proposal due dates to spread out the work for the understaffed research program managers and providing tentative notification to proposers when budget uncertainty (e.g., lack of appropriations, lack of operating plan) delays final decision authority.	
	Plan Update: The Heliophysics Division took the steps noted above, and decreased the time within which 80 percent of selection notifications were made to 188 days in FY 2011, surpassing the goal of 207 days.	
Fiscal Year 2010 Performance Improvement	**10PS14**	
	Accountable Organization: Science Mission Directorate, Planetary Science Division	
	Reduce time within which 80% of NRA research grants are awarded, from proposal due date to selection, by 5% per year, with a goal of 130 days.	**FY 2010 Red**
	Why Measure 10PS14 was Not Met: The time within which 80 percent of Planetary Science selection notifications were made increased in FY 2010 to 243 days, exceeding the goal of 221 days.	
	FY 2010 Performance Improvement Plan: The Science Mission Directorate continues to implement changes to reduce delayed selection notifications. These include the scheduling of proposal due dates to spread out the work for the understaffed research program managers and providing tentative notification to proposers when budget uncertainty (e.g., lack of appropriations, lack of operating plan) delays final decision authority.	
	Plan Update: With the impact of the FY 2011 Continuing Resolution (CR) taken into account, Planetary Science showed only minimal improvement during FY 2011, decreasing the time for selection notifications from 243 days to approximately 240 days (value removes the estimated impact of the extended CR).	
Fiscal Year 2011 Performance Improvement	**ES-11-22 (Efficiency Measure)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Reduce time within which 80 percent of NASA Research Announcement (NRA) research grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days.	**FY 2011 Yellow**
	Why Measure ES-11-22 was Not Met: This annual performance target was not met, for the time to complete its grant proposal evaluation and selection process, by the Earth Science Division, within the Science Mission Directorate. The targeted amount of time was missed by 33 days, approximately 16% of the planned time. The time to award was impacted by the year-long Continuing Resolution, on the order of a 50 day delay, on average, across the Science Mission Directorate.	
	FY 2011 Performance Improvement Plan: The Science Mission Directorate continues to implement changes to reduce delayed selection notifications. In FY 2012, this will include providing tentative notification to proposers when budget uncertainty (e.g., lack of appropriations, lack of operating plan) delays final decision authority. As the year progresses, other options will also be visited.	

Fiscal Year 2011 Performance Improvement	**PS-11-17 (Efficiency Measure)**	
	Accountable Organization: Science Mission Directorate, Planetary Science Division	
	Reduce time within which 80 percent of NASA Research Announcement (NRA) grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days.	**FY 2011 Red**
	Why Measure PS-11-17 was Not Met: This annual performance target was not met, for the time to complete its grant proposal evaluation and selection process, by the Planetary Science Division, within the Science Mission Directorate. The targeted amount of time was missed by 76 days, approximately 35% of the planned time. The time to award was impacted by the year-long Continuing Resolution, on the order of a 50 day delay, on average, across the Science Mission Directorate. It is estimated that without the impact of the Continuing Resolution, the Planetary Science Division would have missed its target regardless. Other factors contributing to the missed target included staffing transitions in positions key to this process during FY 2011 (new Research and Analysis Lead and new program scientists). The involvement of these scientists in critical mission activities for multiple 2011 launches (Juno, GRAIL, MSL), as well as multiple FY 2011 Announcements of Opportunity also prevented improvement.	
	FY 2011 Performance Improvement Plan: Many of the staffing-level factors seen in FY 2011, that contributed to missing the target, are not expected to be repeated and impact the FY 2012 results. The Science Mission Directorate continues to implement changes to reduce delayed selection notifications. In FY 2012, this will include providing tentative notification to proposers when budget uncertainty (e.g., lack of appropriations, lack of operating plan) delays final decision authority. As the year progresses, other options will also be visited.	
Change Due to New Findings		
Fiscal Year 2010 Performance Improvement	**10AT02**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	Develop an atomistically-based model capable of predicting within 25% the degradation caused by environmental effects on interfaces in selected polymer matrix composite materials.	**FY 2010 Yellow**
	Why Measure 10AT02 was Not Met: This effort attempted to significantly push the state-of-the-art in atomistic-based computational modeling, and application of such models to predict the effects of aging of epoxy matrix resins used on commercial aircraft. The computational model that was developed predicted a reduction in surface energy over time, which is consistent with physical aging phenomenon reported in the literature. While the surface energy predictions differed somewhat from the measured values, experiments on lap shear specimen data for both surface energy and lap shear strength validated the predicted trends. Due to variability in computational and experimental results, it was not possible to validate the computational model for accurate quantitative prediction of physical aging to the performance level defined in the green success criteria.	
	FY 2010 Performance Improvement Plan: The activity as defined in the APG is complete The performance level defined in the yellow success criteria was achieved. Since this was a “stretch-goal” no plans exist to continue to attempt to reach the absolute accuracy reflecting a green success criteria. However, the results obtained will inform future research in atomistic computational modeling. Further, successful prediction of the trends observed in experiments show that atomistic computational modeling may indeed be a valuable tool to guide new material development for improved durability.	
	Plan Update: No further activity is planned.	

Availability of Research Facilities		
Fiscal Year 2010 Performance Improvement	**10AC12**	
	Accountable Organization: Exploration Systems Mission Directorate, Advanced Capabilities	
	Demonstrate one year of experimental operation of the Vehicle Cabin Atmosphere Monitoring (VCAM) system on orbit.	**FY 2010 Yellow**
	Why Measure 10AC12 was Not Met: NASA delivered and installed the VCAM in FY 2010. To date, the instrument has operated successfully; however, due to delays in the Space Shuttle launch schedule this instrument was not in place in time to demonstrate a full year of operation by the close of the fiscal year, per the annual performance goal.	
	FY 2010 Performance Improvement Plan: The VCAM is fully functional and on track for reaching one year of experimental operation in March 2011.	
	Plan Update: In May 2011, the VCAM successfully completed one year of operations onboard the ISS. An independent assessment of the VCAM’s performance validated its technical capabilities.	

Fiscal Year 2010 Performance Improvement	**10AT10**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	Complete CFD predictions of ramjet-to-scramjet mode-transition and compare to wind tunnel and/or X-51 flight test data.	**FY 2010 Yellow**
	Why Measure 10AT10 was Not Met: NASA delayed this work into FY11 due to Air Force X-51 flight delays. NASA received the data from the first flight on May 26, 2010, in August 2010. The next flight (second of four) is scheduled for the December 2010 through January 2011 time period. The data from the remaining X-51 flights is required to meet APG. The APG completion date estimate has been revised to September 2011.	
	FY 2010 Performance Improvement Plan: Information from remaining flights of Air Force X-51 required to achieve this APG.	
	Plan Update: Information from the remaining flights of Air Force X-51 are required to achieve this APG. The second flight of the X-51A was attempted June 13, 2011. However, the flight test failed due to the failure of scramjet to operate. The X-51 test flight team is continuing to review the flight data to determine the cause of the failure. As such, the schedules for X-51 flights 3 and 4 are unknown at this time. NASA will conduct the CFD comparisons with the flight test data and achieve this annual performance goal, once all data has been received from successful flight tests of the X-51A.	
Fiscal Year 2011 Performance Improvement	**AR-11-9 (Performance Goal 4.1.3.1)**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	Validate NASA propulsion Computational Fluid Dynamics (CFD) codes using Hypersonic International Flight Research Experimentation (HIFiRE) scramjet flight data and ground-based test results.	**FY 2011 Yellow**
	Why Measure AR-11-9 was Not Met: This annual performance goal was not met, in this fiscal year, and is expected to be accomplished in the June/July 2012 timeframe. To validate the Computational Fluid Dynamics (CFD) code, NASA is gathering this data on the Hypersonic International Flight Research Experimentation (HIFiRE) #2 vehicle's scramjet, while in flight. The Air Force has moved the date for the HIFiRE #2 vehicle launch until Summer 2012.	
	FY 2011 Performance Improvement Plan: This goal will be considered complete once code validation occurs using the flight data when available, following the successful launch of the HIFiRE #2.	
Fiscal Year 2011 Performance Improvement	**AR-11-12 (Efficiency Measure)**	
	Accountable Organization: Aeronautics Research Mission Directorate	
	Deliver at least 86 percent of on-time availability for operations and research facilities.	**FY 2011 Yellow**
	Why Measure AR-11-12 was Not Met: The on-time availability of the operations and research facilities managed by the Aeronautics Test Program, was 80%, slightly less than the targeted 86% availability. NASA did not meet its target, primarily due to the downtime, introduced with the failure of subsystems in two facilities at the Glenn and Langley Research Centers. At Glenn Research Center, the 8 foot by 6 foot Wind Tunnel, had unscheduled downtime to repair the Open Rotor Propulsion Rig (ORPR) forward balance, which has resulted in rescheduling testing into FY 2012. At Langley Research Center, the 14 foot by 22 foot Wind Tunnel experienced unscheduled downtime due to issues with the main drive lubrication system and the motor generator set.	
	FY 2011 Performance Improvement Plan: In FY 2011, the Aeronautics Test Program (ATP) Capability Investment project manager initiated a new set of facility assessment actions which will provide the program with updated information on the condition of the tunnel infrastructure and sub-systems. To date, five assessments have been completed and six additional assessments are scheduled to begin at the end of this fiscal year. The updated condition information will potentially allow the ATP program to identify and resolve critical maintenance issues before they impact customer testing schedules.	

Additional Context

Performance Measure HE-11-9: *Reduce time within which 80 percent of NASA Research Announcement (NRA) grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days* is rated Green. This annual performance goal was met. The Heliophysics Division within the Science Mission Directorate has met its annual target for time to complete its grant proposal evaluation and selection process.

Performance Measure AS-11-9: *Reduce time within which 80 percent of NASA Research Announcement (NRA) grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days* is rated Green. This annual performance goal was met. The Astrophysics Division within the Science Mission Directorate has met its annual target for time to complete its grant proposal evaluation and selection process.

Baseline Cost and Schedule Changes

NASA's projects are generally high-risk, one-of-a-kind space flight mission developments that usually do not enter an "operational" or production state. Estimating cost and schedule baselines for these types of projects is complex and challenging, with many factors that introduce risk and must be accounted for. Risks can be introduced based on factors in the industrial base such as launch vehicle availability, an absence of needed vendor capabilities, and/or counterfeit parts. An instability of funding, delays in funding, or a misalignment of resources, which is estimated to be needed in a specified timeframe, can significantly contribute to cost and schedule growth. Additionally, various acquisition challenges, such as protests on a vendor award, can impact project costs and schedule baselines. Ineffective project planning and controls can impact the ability to understand these factors and to address them in a manner to either recognize or mitigate cost and schedule growth. Specifically, effective lifecycle cost and schedule management requires:

- Good lifecycle cost-estimating policy and processes (sets good baselines).
- Institution of tracking and trending methodologies and using "best practice" tools to predict life-cycle estimate changes (proactively predicts baseline drift and violation of that baseline).
- Effective risk identification, and planning for the costs to mitigate and deal with these risks if they manifest (manages threats to life-cycle cost/schedule changes).
- Clear reporting requirements and responsibilities (ensures accountability).
- Making budget planning and allocation decisions based on lifecycle cost and schedule estimates and the performance toward these (ensures alignment of funding needs to lifecycle needs).

Since 2005, the Agency has taken many steps to make progress in this complex area, including new estimating processes, setting new policies to better align budgeting with cost estimation, and reports on both a quarterly and annual basis to the Office of Management and Budget and U.S. Congress, respectively, ensuring accountability and transparency. NASA continues to build on each step toward improving cost and schedule performance.

NASA began a new cost and schedule estimation initiative, joint cost and schedule confidence levels (JCL), to increase the likelihood of project success at the specified funding level. The application of the JCL process is expected to increase the insight of project and program managers and others into uncertainties and contingencies within an integrated cost and schedule plan. NASA is taking steps in the early (formulation) stages of projects to ensure appropriate technical risk reduction and is actively refining the cost ranges for projects in formulation to improve budget estimates as these projects make their way through Phases A and B. Projects in development are budgeted to a Life Cycle Cost reflecting a 70 percent cost confidence level (CCL) or, more conservatively, a JCL. In conjunction with the JCL initiative, NASA issued an Interim Directive to the *NASA Procedural Requirements 7120.5D: Space Flight Program and Project Management Requirements*. This interim directive strengthened and clarified the existing program and project management requirements regarding cost and schedule baselining and rebaselining policy.

NASA enhanced acquisition policies and procedures. One main policy element introduced was to base acquisition on an expanded view of cost and schedule risks realistic cost estimates and achievable schedules, and to confirm this on an annual basis. This includes incorporating a risk-informed acquisition process that provides an integrated and holistic view of risk, including Agency-level, institutional, and program/project. A more holistic view of risk helps to better match the stakeholder expectations and the "true" resources required to address the risks and achieve those expectations. An integrated perspective of risks and aids for analyzing competing decision alternatives can help appropriately apply funds.

NASA also increased its oversight and surveillance, on programs and projects as well as procurements. The construct for performance reviews was modified to ensure that at key decision points, in-depth independent reviews were conducted, paired with ongoing surveillance in between. Programs and projects are both subjected to episodic independent reviews, conducted by Standing Review Boards, at key points in the life cycle. Monthly or quarterly senior management reviews will assess ongoing programmatic and institutional performance and identify crosscutting issues. To aid in both program/project and contractor surveillance and oversight, Agency earned value management (EVM) capabilities and capacity are being increased. NASA decided to build an Agency-wide capability to effectively use EVM on in-house efforts and to provide an integrated contractor and in-house EVM reporting capability. The latter process is expected to be rolled out initially on the Ice, Clouds, and Land Elevation Satellite (ICESat)-II and Space Launch System projects.

NASA will continue to follow through with the new policies, procedures, and management attention on cost and schedule growth in the coming year, with the goal of improving the Agency's future performance.

Fiscal Year 2010 Performance Improvement	**10IT11**	
	Accountable Organization: Office of the Chief Information Officer	
	Complete all development projects within 110% of the cost and schedule baseline.	FY 2010 Red
	Why Measure 10IT11 was Not Met: All but one project finished within the required 110 percent of cost and schedule baselines. The Security Operations Center (SOC) implementation (Phase-2) project has undergone schedule slips, due to delays in facilities power modifications resulting in delays of receiving IT Security event data from numerous sources across the Agency. The delay in having adequate power to the facility kept the SOC from being able to capture data, thereby not allowing testing and not being ready to complete the ORR. The extra power lines and resultant coordination were not planned for when the project was initially scoped and were beyond the initial project plan estimates. The final SOC implementation plan will increase cost to 145 percent and schedule to 161 percent of the initial project scope. NASA reviewed this project during implementation, and given the importance of IT security, approved additional time and funding for the project.	
	FY 2010 Performance Improvement Plan: There are no options to achieving this goal. NASA determined the IT Security Operations Center project implementation fits into the CyberSecurity scope and needed to be accomplished to protect NASA's IT vulnerability.	
	Plan Update: N/A	
Fiscal Year 2010 Performance Improvement	**10HE09**	
	Accountable Organization: Science Mission Directorate, Heliophysics Division	
	Complete all development projects within 110% of the cost and schedule baseline.	FY 2010 Red
	Why Measure 10HE09 was Not Met: NASA did not complete the Solar Dynamics Observatory (SDO) within 110 percent of cost and schedule baselines. SDO initially slipped from its 2008 firm slot in the launch manifest due to late delivery of avionics boxes and instruments and problems with electronics parts and the high-speed data bus. SDO then experienced difficulty obtaining a new slot in the launch manifest, as no firm slots were available until 2010 due to multiple Atlas V launch vehicle issues and associated launch queue delays.	
	FY 2010 Performance Improvement Plan: NASA launched SDO in February 2010. This exceeded the original schedule by 48 percent, but the mission's lifecycle cost remains within seven percent of the original cost baseline.	
	Plan Update: N/A	
Fiscal Year 2010 Performance Improvement	**10ES17**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete all development projects within 110% of the cost and schedule baseline.	FY 2010 Red
	Why Measure 10ES17 was Not Met: NASA did not complete the Glory and Aquarius missions within 10 percent of their cost and schedule baselines.	
	FY 2010 Performance Improvement Plan: The Glory mission experienced significant cost and schedule growth due primarily to the failure of the Orbiting Carbon Observatory (OCO) Taurus XL launch vehicle and issues with the vendor's production of acceptable boards for the Maxwell Single Board Computers. Glory's current projected lifecycle cost is 68 percent higher than the baseline established at Confirmation Review. The mission is tentatively scheduled for a February 2011 launch readiness date, a 72 percent increase in schedule. The Aquarius launch readiness date has been rescheduled for April 2011 due to delays in the development of the international partner's Mission Operations System. The schedule for the mission has increased by 60 percent, but the lifecycle cost remains within 15 percent of the baseline.	
	Plan Update: N/A	
Fiscal Year 2011 Performance Improvement	**ES-11-19 (Efficiency Measure)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete all development projects within 110 percent of the cost and schedule baseline.	FY 2011 Red
	Why Measure ES-11-19 was Not Met: This annual performance goal was not met, due to cost and schedule growth that exceeded 10 percent of their estimated baseline for the NPOESS Preparatory Project (NPP), Glory, and Aquarius missions. The NPP mission experienced delays due to the restructure of the project management and on-going development issues with an instrument, contributed by one of NASA's partners. The Aquarius mission was delayed by NASA's international partner, after the successful delivery of NASA's instrument contribution. The Glory mission had both instrument and spacecraft technical issues, across its development.	
	FY 2011 Performance Improvement Plan: NASA's new 70 percent CL requirements include consideration of the risks of partnership. These and other procedures subsequently put in place are improving cost and schedule performance.	

Development Partner Challenges		
Fiscal Year 2010 Performance Improvement	**10ES02**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Develop missions in support of this Outcome, as demonstrated by completing Aquarius Operational Readiness Review (ORR).	**FY 2010 Yellow**
	Why Measure 10ES02 was Not Met: Due to delays in the development of the international partner's Mission Operations System, the ORR was not completed in FY 2010.	
	FY 2011 Performance Improvement Plan: A specific date has not been identified, but NASA estimates this to be in early 2011. However, any delays to the overall mission schedule could cause the ORR to move further.	
	Plan Update: The Aquarius Operational Readiness Review was completed April 28, 2011.	
Vendor Quality Parts and Processes		
Fiscal Year 2010 Performance Improvement	**10ES21**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Develop missions in support of this Outcome, as demonstrated by completing the Pre-Ship Comprehensive Performance Test for Glory.	**FY 2010 Yellow**
	Why Measure 10ES21 was Not Met: The Glory Pre-Ship Comprehensive Performance Test began on September 17, 2010, but was not completed until October 4, 2010. The test was delayed primarily due to resolution of spacecraft hardware anomalies.	
	FY 2010 Performance Improvement Plan: The test was completed successfully on October 4, 2010.	
Fiscal Year 2010 Performance Improvement	**10AS07**	
	Accountable Organization: Science Mission Directorate, Astrophysics Division	
	Develop missions in support of this Outcome, as demonstrated by completing the first competed Early Science observations on the Stratospheric Observatory for Infrared Astronomy (SOFIA).	**FY 2010 Yellow**
	Why Measure 10AS07 was Not Met: Technical problems with the telescope cavity door actuator on the SOFIA aircraft, due to quality control issues at the vendor of the actuator, led to increased time required for flight testing and certification for open-door flight at the altitude required for Early Science. NASA worked directly with the vendor to address and resolve the quality control issues.	
	FY 2010 Performance Improvement Plan: Flight testing of the full flight envelope has been completed, and the first image has been acquired by the telescope in flight. The program is currently on track for the first Early Science observation by December 2010.	
	Plan Update: SOFIA completed the first of three science flights on Wednesday, December 1, 2010.	
Fiscal Year 2011 Performance Improvement	**ES-11-3 (Performance Goal 2.1.1.2)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Initiate the Orbiting Carbon Observatory-2 (OCO-2) Instrument and Spacecraft System-Level Testing.	**FY 2011 Yellow**
	Why Measure ES-11-3 was Not Met: The OCO-2 instrument system-level testing was scheduled to begin in August 2011, but has been delayed to October due to technical issues. Technical issues included a coating adhesion issue on multiple parts that was introduced by contamination during the vendor's process, and a misalignment along an optical path on the instrument, which was seen during vibration testing and could impact performance. Additionally, the spacecraft-level system testing is scheduled to begin in December 2011, due to late deliverables from subsystem vendors. At this time, the overall delivery of the spacecraft remains unchanged for March 2012, but the instrument delivery has been delayed by one month to April 2012, and NASA continues to work with its vendors to address these issues and prevent further delays.	
	FY 2011 Performance Improvement Plan: To address the coating adhesion issue, a decision was made to proceed with an alternate vendor and process (black anodizing) for the parts. The change was implemented and all parts now meet specification. Additionally, the optical path misalignment issue was addressed and appears to be resolved, but it will remain open until confirmed during instrument-level vibration testing (scheduled for December 2011). These two issues have resulted in an approximately a one month delay in delivery of the instrument (now April 2012). This delay is not expected to impact the overall delivery schedule of the observatory or the launch readiness date (LRD). The Spacecraft System-Level Testing has been scheduled for December 2011 due to the late subsystem vendor deliveries. However, the spacecraft remains on plan to be delivered in March 2012, with no impact to the Launch Readiness Review.	

Fiscal Year 2011 Performance Improvement	**ES-11-6 (Performance Goal 2.1.2.2)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete the Global Precipitation Mission (GPM) Systems Integration Review	**FY 2011 Yellow**
	Why Measure ES-11-6 was Not Met: Both the NASA spacecraft and instrument developments are experiencing challenges in subsystem deliveries. These development challenges are resulting from various issues including defects discovered in flight parts, component manufacturing throughput issues and workmanship issues at supply vendors. In addition, the delivery of the JAXA (Japanese space agency)-provided Dual Precipitation Radar (DPR) instrument has been delayed due to disruptions at, and damage to, the test facility resulting from the March 2011 earthquake. Technical issues with the DPR were also identified during environmental testing. It is currently estimated that these challenges will result in a launch readiness delay of eleven months, from July 2013 to June 2014.	
	FY 2011 Performance Improvement Plan: NASA and JAXA are working together to replan the program to accommodate these delays. NASA and JAXA have taken actions that include implementing extended shifts/weekend work and integration and testing workarounds (for NASA, the use of engineering test units in place of flight subsystems) to recover schedule where feasible. Completion of the Systems Integration Review is scheduled for the second quarter of FY 2012.	

Launch Vehicle Availability & Reliability/Manifest Issues		
Fiscal Year 2010 Performance Improvement	**10ES10**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Develop missions in support of this Outcome, as demonstrated by completing the SMAP Preliminary Design Review (PDR).	**FY 2010 Yellow**
	Why Measure 10ES10 was Not Met: The Soil Moisture Active and Passive (SMAP) mission PDR is currently scheduled for March 2011, consistent with the schedule presented at the mission's Initial Confirmation Review.	
	FY 2010 Performance Improvement Plan: Currently, all pre-cursor events (i.e., peer reviews, sub-system PDRs) are proceeding on or ahead of plan. However, a launch vehicle has not yet been selected for SMAP, and this could impact the scheduling of the PDR. NASA is addressing this issue, but it is not expected to be resolved until after March.	
	Plan Update: The Prelminary Design Review for the SMAP mission occurred in October 2011.	
Fiscal Year 2011 Performance Improvement	**ES-11-10 (Performance Goal 2.1.4.2)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete the Soil Moisture Active-Passive (SMAP) Confirmation Review.	**FY 2011 Yellow**
	Why Measure ES-11-10 was Not Met: The SMAP Confirmation Review was delayed to FY 2012 because of difficulties in identifying an acceptable launch vehicle for the mission. NASA's Earth Science program has been impacted by the current limited availability of launch vehicles in the medium size range that is appropriate for most of its missions.	
	FY 2011 Performance Improvement Plan: The SMAP Confirmation Review has been rescheduled until the second quarter of FY 2012. The Science Mission Directorate (SMD) plans to conduct a Directorate-level Program Management Council (DPMC) review in November 2011 to assess project status and establish near-term observatory development guidelines and constraints following the recent Preliminary Design Review. To conduct the PDR, SMD management requested the project assume use of a Minotaur IV+ launch vehicle. This DPMC will also assess a plan to establish a project baseline cost and schedule, that is independent of a confirmed launch vehicle (which is not expected until mid 2012). This plan forward will consider analysis of observatory design, cost and schedule risks, and any additional required reviews. In parallel with these activities, SMD will continue to work with the Human Exploration and Operations Directorate to pursue launch vehicle options for SMAP.	

Funding Instability		
Fiscal Year 2011 Performance Improvement	**ES-11-14 (Performance Goal 2.1.5.3)**	
	Accountable Organization: Science Mission Directorate, Earth Science Division	
	Complete the ICESat-2 Spacecraft System Requirements Review.	**FY 2011 Yellow**
	Why Measure ES-11-14 was Not Met: The date for the ICESat-2 Spacecraft Systems Requirements Review has been delayed to December 2011. This review was rescheduled from March 2011 to revisit the mission design and requirements to align with the estimated available budget, moving forward.	
	FY 2011 Performance Improvement Plan: The mission design and requirements have been revised to align to the available funds. As part of the realignment, the mission is moving forward based on a co-manifested launch solution, with shared launch costs, with the Air Force. The Spacecraft System Requirements Review is scheduled for December 2011. The mission's baseline plan is to be manifested with the Defense Meteorological Satellite Program Flight-20 (DMSP F-20) on an Atlas V launch vehicle that has already been purchased by the U.S. Air Force (USAF). NASA will be responsible for funding the Dual Spacecraft System (DSS) development and flight unit qualification. The DSS will represent a new capability for U.S. government payloads using the EELV launch system. The USAF will procure the launch service and provide overall mission assurance related to the launch vehicle and dual payload accommodation. This interagency arrangement provides significant cost savings for NASA, allowing the mission to proceed within its allocated budget.	

Program Planning and Controls		
Fiscal Year 2010 Performance Improvement	**10IT06**	
	Accountable Organization: Office of the Chief Information Officer	
	Complete Operational Readiness Review (ORR) for the NASA Security Operations Center.	**FY 2010 Red**
	Why Measure 10IT06 was Not Met: The Security Operations Center (SOC) Implementation Project was scheduled to have the ORR this year, but has undergone schedule slips due to delays in facilities power modifications and further delays in receiving IT Security data from numerous sources across the Agency. These delays have negated the ability to complete the testing required in preparation of the Operational Readiness Review.	
	FY 2010 Performance Improvement Plan: The SOC Implementation Project will move forward with IT Security event data collection in fall 2010. As the data is obtained, the project will complete final system integration and validation testing. Upon completing validation testing and user training the project will precede to ORR currently scheduled for November FY 2011.	
	Plan Update: The SOC ORR was completed March 2011.	
Fiscal Year 2010 Performance Improvement	**10SFS07**	
	Accountable Organization: Space Operations Mission Directorate, Space and Flight Support	
	Complete TDRS K/L Project Mission Operations Review (MOR).	**FY 2010 Yellow**
	Why Measure 10SFS07 was Not Met: The TDRS project had originally scheduled the K/L MOR for September 2010 but was delayed to resolve minor conflicts involving resources.	
	FY 2010 Performance Improvement Plan: The MOR will be held in November 2010.	
	Plan Update: The Mission Operations Review was held in November 2010.	
Fiscal Year 2010 Performance Improvement	**10PS06**	
	Accountable Organization: Science Mission Directorate, Planetary Science Division	
	Develop missions in support of this Outcome, as demonstrated by completing the Mars Science Laboratory (MSL) flight hardware builds and flight system assemblies.	**FY 2010 Yellow**
	Why Measure 10PS06 was Not Met: The flight hardware build and flight system assembly of the Sample Analysis at Mars (SAM) instrument were not completed during the designated fiscal year, due to complications in the development of the Wide Range Pump (WRP) components of the instrument. The materials originally specified as the primary component of a high-speed, high-performance bearing proved to be inadequate to provide the necessary performance on the surface of Mars, and alternative bearing materials and components had to be researched and developed.	
	FY 2010 Performance Improvement Plan: The development of the new bearing designs has been completed and implemented, and the finalization of the flight hardware build has resumed. The final flight units are on schedule to be delivered in early December 2010.	
	Plan Update: The work was completed by redesigning the primary bearings on the pump from alternate materials that provided the required performance for the Mars environment. Design, fabrication, testing, validation, and installation of the new bearings was completed according to the revised schedule. The pump was completed and delivered to the flight project as scheduled in December 2010.	

Fiscal Year 2011 Performance Improvement	**Performance Goal 2.4.2.2**	
	Accountable Organization: Science Mission Directorate, James Webb Space Telescope Program	
	Design and assemble James Webb Space Telescope (JWST).	**FY 2011 Yellow**
	Why Performance Goal 2.4.2.2 was Not Met: The measure was placed in the FY 2012 Congressional Justification prior to the project's replan. Based on this, the baseline assumption for the measure was that the project was still operating under the original baseline. The new estimated baseline, which was approved late in the fiscal year, resulted in a 78% increase in the estimated life cycle cost from the original baseline. The new estimated baseline has been endorsed by the NASA Administrator, all reporting required by Section 103 of the NASA Authorization Act of 2005 has been completed, and 95% of the FY 2011 planned activities were accomplished, indicating that it is likely to stay on track for the new estimated cost. Specifically, JWST achieved 19 of its 21 planned FY 2011 milestones on or ahead of schedule, one milestone was achieved one month late and one milestone was delayed due to design changes, and is on track to achieve its FY 2012 milestones. The one planned FY 2011 milestone that was achieved a month late and the one that has been delayed do not impact the critical path.	
	FY 2011 Performance Improvement Plan: NASA has taken many steps to address the challenges seen on the JWST Project. In FY 2010, an independent panel concluded that the problems causing cost growth and schedule delays on the JWST project were associated with cost estimation and program management. To address these, NASA made several important changes in JWST program and project management and in the interaction with the prime contractor. All the JWST senior management at both Headquarters and at Goddard Space Flight Center have been replaced. The program has been taken out of the Astrophysics Division and now reports programmatically to the NASA Associate Administrator, and is an Agency priority. NASA also embarked on revising the cost and schedule estimates. The replanning activity is complete, has been approved within the Agency. The Agency will continue to monitor the progress on the development of this project, as highlighted above.	
Acquisition Management Challenges		
Fiscal Year 2010 Performance Improvement	**10SFS08**	
	Accountable Organization: Space Operations Mission Directorate, Space Communications and Navigation	
	Complete SN Ground Segment Sustainment project (SGSS) Mission Definition Review.	**FY 2010 Yellow**
	Why Measure 10SFS08 was Not Met: The SGSS Mission Definition Review did not occur as planned due to an ongoing contractor protest.	
	FY 2010 Performance Improvement Plan: NASA will develop a new plan and schedule for completing the Mission Definition Review once the protest is adjudicated.	
	Plan Update: The SGSS contract award was upheld in FY 2011. After the contract was initiated, it was determined that dividing the Mission Definition Review into two parts, with the first part focused on the technical review, and the second part focused on budget, was the appropriate approach. The technical review, which was very successful, was held in July 2011; the second review is scheduled to be held in December 2011.	
Fiscal Year 2010 Performance Improvement	**10PS05**	
	Accountable Organization: Science Mission Directorate, Planetary Science Division	
	Develop missions in support of this Outcome, as demonstrated by selecting concept studies for the Discovery 12 mission.	**FY 2010 Yellow**
	Why Measure 10PS05 was Not Met: The acquisition timeline for the Discovery 12 mission was extended due to the complexity of the Announcement of Opportunity, which includes the potential use of radioisotope power systems.	
	FY 2010 Performance Improvement Plan: Twenty-eight proposals have been received. Selection of concept studies is scheduled for mid-FY 2011.	
	Plan Update: In May 2011, NASA selected three mission concepts (GEMS, TiME, and Comet Hopper) for study from the 28 proposals received. After a detailed review of the three concept studies in 2012, one will be selected as the 12th Discovery Program mission.	

Fiscal Year 2011 Performance Improvement	AMO-11-12 (Performance Goal 5.2.2.1)	
	Accountable Organization: Office of the Chief Information Officer	
	Achieve Initial Operating Capability (IOC) for five Service Offices (Web Services, Communications, Enterprise Service Desk, End User Services, and NASA Enterprise Applications) as part of the NASA Information Technology Infrastructure Integration Program (I3P).	**FY 2011 Yellow**
	Why Measure AMO-11-12 was Not Met: Four of the five planned service offices achieved Initial Operating Capability (IOC). The End User Services (ACES), Enterprise Applications (EAST), Enterprise Service Desk (ESD), and Communications (NICS–Networking) services all have their office structures in place, are managing the transition to these new services, and continue to operate the current services. The one service office that did not reach IOC in FY 2011 is the one for the Web services (WEST). The implementation of this initiative has been delayed to resolve some issues with the contract award. NASA remains on track for the consolidation and centralization of these services and capabilities by 2014.	
	FY 2011 Performance Improvement Plan: NASA will continue to work through the issues with the contract award of the web services capability. The implementation of the WEST will be revisited once these issues are resolved.	

Additional Context

Performance Measure ES-11-2: *Complete the Aquarius Launch Readiness Review* is rated Green. The Launch Readiness Review was completed on June 7, and Aquarius was successfully launched on June 10, 2011.

Performance Measure JWST-11-1: *Complete new James Webb Space Telescope (JWST) mission re-baseline* is rated Green. The JWST project completed its rebaseline in September, and information on the new estimated cost and schedule, has been provided to both the Congress and OMB.

Workforce, Workplace, and Diversity

NASA values its workforce and strives to improve its productive environment. The ultimate goal is to ensure the workplace allows employees from diverse backgrounds, ethnicities, and genders to reach their potential and contribute to NASA's mission. Multiple offices work together, to this end, including the Office of Human Capital Management, the Office of Diversity and Equal Opportunity, and the Office of Education. The latter office contributes to developing a national science, technology, engineering, and mathematics (STEM) workforce, one that NASA can draw upon to meet its hiring needs.

The performance measures below demonstrate NASA's efforts to continually improve the workforce environment, for all employees through multiple initiatives, and to influence a STEM pipeline, with diverse populations to draw upon for hiring needs. Multiple factors can impact these efforts, including funding delays, imperfect data collection methods, and receiving changes to priorities mid-year from the Administration or Congress. In the case of several of these measures, NASA performance is trending well, but the original targets were aggressive, which is demonstrated by the rating.

<table>
<tr><th colspan="3">Continual Improvement of the Workforce Environment</th></tr>
<tr><td rowspan="4">Fiscal Year 2011
Performance Improvement</td><td colspan="2">AMO-11-6 (Performance Goal 5.1.1.4)</td></tr>
<tr><td colspan="2">Accountable Organization: Mission Support Directorate, Office of Human Capital Management</td></tr>
<tr><td>Identify and address at least two topics that employees identified in the latest Federal Employee Viewpoint Survey.</td><td rowspan="3">FY 2011
Yellow</td></tr>
<tr><td>Why Measure AMO-11-6 was Not Met: This annual performance goal was not met. Many of the planned activities were completed but several have been delayed into FY 2012. Specifically, the identified areas to be addressed, and their corresponding action plan, are as follows:

1) Continue focus on teamwork/working together to ensure mission success. Planned actions included continual monitoring of Shuttle workforce concerns through regular surveys; and instituting a team-building focus in Agency leader development programs. The activities toward this topic were completed in this fiscal year.

2) Ensure that recognition and rewarding of employees is fair, consistent, and based on results-oriented performance. The planned actions included educating and training supervisors, through Agency supervisory training courses; and implementing recommendations for enhancing the Agency's Honor Awards Program. Both of these planned actions were delayed into FY 2012. This year's funding level removed the option for conducting further Agency supervisory courses in FY 2011. Additionally, the development of new policies surrounding the Agency Honor Awards Program, is taking more time than planned, resulting in a delay until FY 2012.</td></tr>
<tr><td>FY 2011 Performance Improvement Plan: These actions will be completed in fiscal year 2012. OHCM will continue focus on teamwork and working together to ensure mission success. Actions include continual monitoring of Shuttle workforce concerns through regular surveys; and team-building focus in Agency leader development programs. OHCM will also ensure that recognition and rewarding of employees is fair, consistent, and based on results-oriented performance. Actions include educating and training supervisors through Agency supervisory training course and to implement recommendations for enhancing the Agency's Honor Awards Program.</td></tr>
<tr><td rowspan="4">Fiscal Year 2011
Performance Improvement</td><td colspan="2">AMO-11-7 (Performance Goal 5.1.1.5)</td></tr>
<tr><td colspan="2">Accountable Organization: Office of Diversity and Equal Opportunity</td></tr>
<tr><td>Complete FY 2011 actions described in the NASA Model Equal Employment Opportunity (EEO) Agency Plan.</td><td rowspan="3">FY 2011
Yellow</td></tr>
<tr><td>Why Measure AMO-11-7 was Not Met: NASA made significant progress on many of 57 activities, contained in the Model EEO Agency Plan for FY 2011-2013, which have efforts in fiscal year 2011, but did not complete all the planned actions. NASA sought to complete 40 of the 57 actions in the first year of the Plan alone. NASA completed 14 of these actions (35 percent). In addition, NASA completed five actions not targeted for completion until FY 2012. Of the other actions targeted for completion in FY 2011, NASA has partially completed 19 (48 percent). NASA has completed key actions related to the Agency's Anti-Harassment Program, Conflict Management Program, and the Functional Review Program is on track for completion of its actions. However, as a result of recent Executive Orders that required development of action plans in FY 2010-2011 for Asian Americans and Pacific Islanders, Individuals with Disabilities, and Veterans, NASA had to add multiple actions to the Model EEO Agency Plan. The initial development of these plans, dispositioning of community group comments, and introduction of approximately 20 new actions, mid-year, did not allow time for full progress to be made. All efforts continue to progress, and are expected for completion before the end of the plan's timeframe.</td></tr>
<tr><td>FY 2011 Performance Improvement Plan: NASA is committed to continuing the efforts to remove barriers to a diverse and inclusive workplace, conducive to employees reaching their potential. In order to fully meet the objectives of the Plan, in FY 2012, NASA will: 1) undertake a careful review of the remaining actions and their target dates, taking into account new information, such as recent Government-wide initiatives relating to EEO and diversity; and 2) revise the Plan accordingly.</td></tr>
</table>

An Inclusive and Diverse STEM Workforce		
Fiscal Year 2010 Performance Improvement	**10ED03**	
	Accountable Organization: Office of Education	
	Serve 8,500 under-represented and under-served students in NASA higher education programs.	**FY 2010 Yellow**
	Why Measure 10ED03 was Not Met: In FY 2009, 6,743 higher education students self-reported as being part of an underserved and underrepresented race or ethnicity. This represents 40.6 percent of the total number of higher education students served by NASA in FY 2009, an increase from 28 percent of all higher education students similarly reporting in FY 2008. Of all higher education students served by the Agency, 43 percent self-reported being women, an increase from 41 percent in FY 2008. These figures are well above national averages for participation of minority students according to the National Science Foundation's report, Women, Minorities, and Persons with Disabilities in Science and Engineering, released in April 2010. The reduction in the number of minority higher education students served (6,743 students rather than the goal of 8,500) also reflects an increased emphasis on institutional awards for education and research, and a corresponding decrease in individual student awards. The overall reduction in direct support to all higher education students in turn affects the total number of higher education underserved and underrepresented students reached by NASA. In FY 2007, the total number of higher education students reached was 34,493; in FY 2008, the number dropped to 24,362, in FY 2009, it dropped further to 24,168. Higher education projects are adjusting to address this trend, but there is significant lag time before results are available (e.g., new course development time, time to execute activities, grant reporting lag time). Another factor adversely influencing the number of individual student awards is the increasing cost of education. To offer individual awards that remain competitive with those of other federal programs and industry, NASA grantees must increase award amounts that meet cost increases in tuition, travel, and other expenses. In a flat or reduced budget environment, an increase in award size means that fewer direct support awards can be made.	
	FY 2010 Performance Improvement Plan: NASA higher education projects are actively working to increase the participation of underrepresented and underserved students. Future efforts include plans to work more closely with community colleges and institutions that tend to serve large numbers of underserved students. The Space Grant Program, which works with affiliates in all 50 states, the District of Columbia, and Puerto Rico, has actively encouraged state consortia to better engage minority-serving institutions in their networks. The consortia are accountable for improving the participation of underserved students in their programs, determined as a percentage of their audience base. The strategy has been successful, as participation of racially and ethnically underserved and underrepresented students in the Space Grant Program has increased from 15 percent in FY 2007, to 21 percent in FY 2008, and to 29 percent in FY 2009.	
	Plan Update: The performance improvement plan was successful, and NASA was able to work more closely with community colleges in FY 2010. In doing so, NASA increased its overall reach to underrepresented and underserved populations. However, the number of underrepresented and underserved students reported for FY 2010 does not reflect the increases seen in previous years, due to the availability of data associated with Space Grant activities. NASA released a supplemental competition, not in the first round of competitions, to the Space Grant Consortia to assist in strengthening linkages with Minority Serving Institutions, but this data will not be available until the end of the 2011 calendar year. The competition was released in late FY 2010 due to ongoing continuing resolutions which delayed funds. As a result, the currently available FY 2010 results only reflect underrepresented and underserved participation resulting from the standard Space Grant awards. The additional Space Grant awards, are expected to yield additional underrepresented and underserved participants, but will not be available until the grant performance period has concluded and grant reporting is completed.	

Fiscal Year 2011 Performance Improvement	**ED-11-1 (Performance Goal 5.1.2.1)**	
	Accountable Organization: Office of Education	
	Achieve 40 percent participation of underserved and underrepresented (in race and/or ethnicity) in NASA higher education projects.	**FY 2011 Yellow**
	Why Measure ED-11-1 was Not Met: This annual performance goal was not met. Out of the 15,947 participants in NASA higher education programs who self-reported their race and ethnicity, 35 percent, reported being a member of an underserved or underrepresented race or ethnic group. NASA's aggressive goal of 40 percent, exceeds the national averages for underserved and underrepresented participation in higher education, and was a challenge that the Agency chose to undertake. The participation in NASA's programs did meet or exceed the percentages of underrepresented minorities pursuing higher education studies in STEM fields nationwide (between 11 to 21 percent of these degrees, at the bachelor level, according to the National Science Foundation Report, Women, Minorities and Persons with Disabilities in Science and Engineering: 2011).	
	FY 2011 Performance Improvement Plan: The cultivation of diversity is a core value for all NASA education efforts, and NASA will challenge itself to continually improve. The performance improvement plan, that addressed the last fiscal year's performance, was successful in that NASA was able to work more closely with community colleges in FY 2010, which reflected in increases seen in FY 2011 measures. In doing so, NASA increased its overall reach to underrepresented and underserved populations, moving from one year to the next. NASA has refocused several projects within the Agency's higher education portfolio during FY 2011 in pursuit of this goal, including the announcement of two new grant opportunities targeted at minority serving institutions and community colleges, which tend to have larger populations of underserved and underrepresented students. In FY 2012, NASA will seek to improve the percentage of underrepresented and underserved students, that participate in its higher education programs by placing increased emphasis on inclusion and participation by these populations in the projects that reach the largest numbers of undergraduate and graduate students, such as the Space Grant Project. Additionally, NASA plans to take a more holistic look, across the Agency, where activities in the mission organizations, may be encouraging participation, and factor in this data for a more complete picture.	
Fiscal Year 2011 Performance Improvement	**ED-11-2 (Performance Goal 5.1.2.1)**	
	Accountable Organization: Office of Education	
	Achieve 45 percent participation of women in NASA higher education projects.	**FY 2011 Yellow**
	Why Measure ED-11-2 was Not Met: This annual performance goal was not met. Out of the 15,568 participants in NASA higher education programs who self-reported their gender, 39 percent, reported being female. Albeit a greater number of women currently pursue higher education studies in the United States, men pursue a higher proportion of the degrees in science and engineering fields. For example, compared with men, women earn degrees at medium to low levels in physical sciences and mathematics (between 30 to 44% of these degrees), and at low levels in computer science and engineering (between 18 to 27% of these degrees). Despite the statistics, NASA still chose to set an aggressive goal of 45 percent, and fell just short of the challenge.	
	FY 2011 Performance Improvement Plan: In FY 2012, NASA will seek to improve the percentage of women that participate in its higher education programs by placing increased emphasis on inclusion and participation by these populations in the projects that reach the largest numbers of undergraduate and graduate students, such as the Space Grant Project. NASA currently conducts a significant number of K-12 and informal STEM education projects that specifically target participation by pre-college girls. By stimulating interest in STEM among young females in the Agency's education pipeline, NASA expects that many of these students will remain engaged and continue to participate in NASA programs upon entering college. Additionally, NASA plans to take a more holistic look, across the Agency, where activities in the mission organizations, may be encouraging participation, and factor in this data for a more complete picture.	

Fiscal Year 2010 Performance Improvement	10ED04	
	Accountable Organization: Office of Education	
	Achieve 60% employment of student participants in FY 2009 NASA higher education programs by NASA, aerospace contractors, universities, and other educational institutions.	**FY 2010 Yellow**
	Why Measure 10ED04 was Not Met: In FY 2010, NASA's education workforce development target was 60 percent of students from NASA's higher education programs entering into NASA-related careers. Of the 1,343 students who self-reported employment data, 625 students (or 46.5 percent) reported working for NASA, aerospace contractors, universities, or other educational institutions. One project, Motivating Undergraduates in Science and Technology (MUST) was used as a prototype for more closely mapping an Office of Education project directly to the NASA Early Career Hiring Initiative. This collaborative approach succeeded in placing 22 of 29 graduates with NASA and JPL. The overall drop in employment rate in these specific sectors, relative to previous years, may be a result of uncertainty in NASA's plans (e.g., retirement of Space Shuttle Program, future of the Constellation Program), and overall poor health of the U.S. economy in 2008/2009. However, 38.6 percent of graduates (in addition to those hired by NASA, aerospace industry and educational organizations), chose STEM-related careers. One might conclude that NASA in-depth education experiences are indicative of STEM workforce preparation.	
	FY 2010 Performance Improvement Plan: NASA organizations with a stake in developing the future workforce will continue to work collaboratively with each other and industry partners to identify future workforce trends and needs. New efforts in the One Stop Shopping Initiative include closer collaboration between NASA's hiring managers and mentors for higher education students.	
	Plan Update: The performance plan was successful. In the year following, of the graduates who participated in NASA Higher education programs and self-reported employment data, 60.3 percent reported working for NASA, aerospace contractors, universities, or other educational institutions. NASA organizations have worked collaboratively with each other, as well as industry partners, to meet their respective workforce needs. Additionally, closer collaboration between NASA's hiring managers and mentors for higher education students have yielded positive results.	

Additional Context

Performance Goal 5.1.1.3: *Achieve and sustain an effective labor-management dialogue* is rated Green.

Performance Measure AMO-11-5: *Identify and address at least three significant labor-management challenges identified during the year during periodic Agency-led Labor Management Forums* is grated Green. This annual performance goal was exceeded as four Labor Management Forums were held on FY 2011. Discussions in these forums addressed usage of term appointment authority, a review of the Agency performance management process with a focus on "level 2" ratings to address concerns about discrimination, and a discussion of line management/program management communication issues.

Performance Goal 5.1.1.6: *Implement an Agency-wide Diversity and Inclusion Framework to develop a more demographically diverse workforce and a more inclusive work environment* is rated Green.

Performance Measure AMO-11-8: *Establish a baseline for diversity by developing and implementing an Agency-wide diversity-inclusion survey* is grated Green. NASA deployed its Diversity and Inclusion (D&I) Assessment Survey in early FY 2010, which was responded to by 40 percent of the workforce. The results of the survey have been completed and disseminated to the Agency's D&I leads and other stakeholders, who continue to use this data to inform the development of NASA's D&I Strategic Plans.

Performance Goal 5.1.1.1: *Define and build the workforce skills and competencies needed for the Agency's future directions in technology development and deep space exploration* is rated Green.

Performance Measure AMO-11-2: *Twenty percent or more of annual recruitments will be through the early career hiring initiatives* is rated Green. This annual performance goal was met, as 20 percent of total hires in FY 2011, are considered "early career".

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